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THE
H I S T O R Y
OF THE
ROYAL SOCIETY of LONDON,
FOR IMPROVING OF
NATURAL KNOWLEDGE,
FROM ITS FIRST RISE.

IN WHICH

The most confiderable of those Papers communicated to the
SOCIETY, which have hitherto not been published, are inserted in their
proper order,

AS A SUPPLEMENT TO

THE PHILOSOPHICAL TRANSACTIONS.

By THOMAS BIRCH, D.D.

SECRETARY to the ROYAL SOCIETY.

VOL. II.

*Talem intelligo PHILOSOPHIAN NATURALEM, quæ non abeat in fumus speculationum subtilium
and sublimium, sed quæ efficaciter operetur ad subleuanda vitæ humanæ incommoda. BACON de
Augm. Scient. L. ii. c. 2.*

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JANUARY 4, 1664^t. Sir WILLIAM PORTMAN, and Sir WINSTONE CHURCHILL, were admitted.

There were read three accounts concerning the comet, one from the earl of Sandwich, another from Leige, and the third from Monsieur HUYGENS, in a letter of his to Sir ROBERT MORAY, dated 2 January 1664-5*. Which accounts were recommended to the president, that he might compare them with the other accounts communicated before, and reduce them all into one perfect relation.

Mr. Hooke shewed the way of applying a thermometer to a weather-cock, by sealing up spirit of wine in a glass cane, with two pretty large heads, one of which was filled with spirit of wine, as was also the intermediate stem; the other not quite full, a space of air being left to give liberty for the expanding liquor. The cane thus filled was poised in the manner of the beam of a balance, and the operation of the heat and cold on it was, that heat expanding the liquor, made it pass through the stem out of the ball perfectly full, into the ball, wherein was left a space of air; so that heat made the air-ball descend, and cold on the contrary, condensing the liquor made it pass out of the air-ball into the full ball, and so made that to descend.

* Letter-Book, vol. i. p. 229.

It was moved to consider, whether this instrument were sensible and nice enough.

Mr. BOYLE mentioned, that his *Experimental History of Cold* was printing^b, and that at the next meeting he would present the society with about twenty heads concerning cold and congelation, to choose out of them experiments for trial in this frosty season. His offer was accepted; and it was desired, that in the mean time those, who could, between that and the next meeting, make any experiments of cold, would make use of this weather, especially Dr. MURRET and Mr. HOOKE; the latter of whom was ordered particularly to prepare a thermometer, that might serve for a standard of heat and cold, by observing the degree of cold, which just freezes common distilled water, and by marking thereupon the expansion of the liquor in the thermometer.

Mr. BOYLE mentioned, that he had been making some experiments of congelation upon both animal and vegetable substances, to discover the placing of the alimental juices in them, and many things concerning the texture of bodies and mortifications. He related particularly of carrots, that being frozen, and cut transversely, the little particles of ice in them were found to lie orderly from the center to the circumference, but cut lengthwise, they lie more confusedly; he was desired to prosecute these experiments, and then to give them in writing.

Mr. HOOKE made an experiment tending to shew, as he conceived, that air is the universal dissolvent of all sulphureous bodies, and that this dissolution is fire; adding, that this was done by a nitrous substance inherent and mixt with the air. The experiment was, that he took a live coal, and put it under a glass vessel; whereupon the coal, after a very little time, went out; but then being taken out, and exposed to the free air, recovered its burning.

It being objected, that it was the agitation of the air driving the igneous particles into the combustible body, which made it burn and consume; Mr. HOOKE answered, that experiment would shew, that a burning body, though agitated, would be extinguished, if it had not a free access of fresh air. He added, that a combustible substance, kept red-hot, even in a fire as hot as to melt copper, would not waste, but as soon as fresh air was admitted, burnt away and consumed.

An experiment was mentioned, to shew, that a burning coal wanting fresh air would keep intire; but brought into new air would fall in pieces.

Mr. BOYLE moved, that a pair of strong bellows being taken, and the clack stopp, and the nose made fast with cement to a receiver, into which a burning coal is conveyed. a wind should be made, by forcing the bellows to and fro, to see, whether it would make the coal burn.

It was ordered, that these experiments should be made ready for the next meeting.

^b It was published in 1665, in 8vo.

Dr. GODDARD suggested the making of the Lord BACON's experiment of inclosing a piece of wood into a cylindrical box of iron, putting it into a hot fire, and keeping it there for a good while, to see what will become of it. He was desired to give the operator directions to make this experiment.

Mr. FRANCIS WILLUGHBY being come home from his travels*, and present, was desired to communicate his philosophical observations made abroad. He produced a printed cut representing SATURN and JUPITER, and what CAMPANI had lately observed in them by the means of his new glasses, wrought by a turn-tool without a mold, viz. that July 30 *b. 2* $\frac{1}{2}$ *nobilis*, he had seen in one of the black belts of JUPITER two blacker spots, moving therein, which Signior CASSINI had first given him notice of, conceiving them to be the shadows of the Satellites, which he had seen come out of the western disk of the planet.

Mr. WILLUGHBY was desired to communicate to the society, at the next meeting, the other observations and collections, which he had made in his travels.

Mr. HOOKE mentioned, that he had seen on the 19th of May 1664, about nine at night, a small spot in the biggest of the three black belts of JUPITER; and that observing it from time to time, he found, that within two hours after, the said spot had moved from east to west, about half the length of the diameter of JUPITER.

It was ordered, that the society be summoned against the Wednesday following, for the election of Mr. HOOKE as curator by office to the society, who was by the president recommended from the council to the society.

January 11, at the meeting of the COUNCIL were present,

The lord viscount Brouncker, president
 Sir ROBERT MORAY
 Sir WILLIAM PETTY
 Mr. SLINGSBY
 Mr. COLWALL
 Mr. HILL
 Mr. HENSHAW
 Mr. PALMER

Sir PAUL NEILE
 Mr. AERSKINE
 Dr. WILKINS
 Dr. GODDARD
 Dr. CROUNE
 Dr. BALLE
 Mr. OLDENBURG.

It was ordered, that Mr. SPRAT be sent to by the secretary, to meet at Dr. WILKINS's house on the Monday following, to consider of certain papers to be inserted in the History of the Society.

At the meeting of the SOCIETY on the same day,

* His relation of his travels through a great part of Spain, whither he went in September 1664, is printed at the end of that of Mr. RAY, London 1673, in 8vo.

The charter-book of the society was produced, wherein his Majesty, on the 9th of January, had written himself CHARLES R. FOUNDER, and his Highness the duke of York JAMES, Fellow; the duke of Albemarle also having entered his name at the same time. The president was desired to kiss his Majesty's hand for this honour.

Sir ROBERT MORAY produced a couple of copper-stones brought out of Nova Scotia, and given him by Sir THOMAS KILLEGREW, both which seemed to have pure copper upon them, yet without any veins appearing in the stones. Dr. WHISTLER mentioned, that what seemed to be good copper, might be but a fluor, which would all fly away in the fire. Dr. CROUNE had leave to give a piece of it to a friend of his, skilful in the extracting of metals, to see what he could extract out of it. Mr. SLINGSBY and Col. LONO were also permitted to take each of them a piece of this stone, and to try the like.

Mr. HOOKE made three experiments, conceived by him to confirm his formerly proposed hypothesis about fire. The one was with a pipe having sulphur in it, sealed up hermetically, which, tho' made red-hot, yet burned not, but as soon as the air was admitted, burned away. The other was, that charcoal put into a pipe, and heated red-hot, did not at all consume or burn. The third was, that charcoal put into a crucible, covered with sand, was kept in a very great heat for about two hours, and being taken out after it had been suffered to stand to cool, was found scarce sensibly diminished.

It being objected, that the air in the vessels being superonerated with the steam of the wood was the cause of the not burning; it was answered by Mr. HOOKE, that an experiment should be made, to shew, that though the air were not thus superonerated, yet the burning substance would go out, upon the account of wanting fresh air; and that this would be done by drawing the air out of the vessel, and making thereby the smoke fall down.

He proposed an experiment to be made at the next meeting by blowing forcibly with a certain contrivance the air included in a box, upon the coals, without making the coals burn.

Mr. HOOKE was elected curator, by office, to the society, and that for perpetuity, with a salary of 30 l. a year *pro tempore*.

Sir ROBERT MORAY acquainted the society with the relation, which he had received from Major HOLMES, concerning the two pendulum watches^a recommended to him to try them in his late voyage to Guinea; the sum whereof was^a, that in his return homewards, being obliged to sail from Cape Corso upon the coast of Guinea, westward some 500 or 600 leagues, to get the wind, he afterwards steered his course north-east for 400 or 500 leagues; and then water beginning to fail to the three ships in his company, and this want obliging him to think of a place to re-

^a Invented by Mons. HUYGENS, and fitted to
-go to sea by the earl of Kincardin, Phil. Trans. ^{n^o i. p. 14.}
^a Ibid. p. 13, 14.

fresh, he called the masters and pilots together, to compare their accounts about the place where they were; which being done, it was found, that one of the pilots was 80 leagues, another 100, and the third 120 leagues farther westward than Major HOLMES, who considering his reckoning, made by the pendulum-watches, found himself to be not above 30 leagues from the isle of Fuego, one of the islands of Cape Verde. Whereupon the three pilots coming, in their calculation, nearer to one another than to that of Major HOLMES, desired to go to the Barbados, to water there; to which Major HOLMES replied, that finding himself so near to Fuego by his watches, which he had no reason to mistrust, he desired, that they would follow him, and steer their course thither; wherein having prevailed, he fell the very next day about noon upon the very island, which he had mentioned.

SIR ROBERT MORAY added, that Major HOLMES had promised to give to the society a full and punctual account hereof in writing.

Mr. BOYLE brought in some printed copies of a part of his *Experimental History of Cold*, with a desire, that they might be recommended to the perusal of some of the society, to collect from thence such experiments, as are there proposed and wished to be made, or such as were by him made but imperfectly. The president took one of them, and delivered the rest to Dr. GODDARD, Dr. MERRET, Dr. WHISTLER, Dr. BALLE, and Mr. HOOKE, upon condition to answer the end, for which they were presented by the author.

Dr. MERRET related, that the frost of this season had been somewhat extraordinary, since it had produced effects not ordinary in this climate, by freezing whole bottles of white wine, rhenish wine, and claret, as also sack in small glass canes, and likewise a little part, as big as a silver half-penny, of the solution of *Sal Gemma* at the bottom. It being inquired by Mr. BOYLE, whether this last might not be a coagulation rather than a congelation, it was answered by Dr. MERRET, that, as far as he could judge, it was a right congelation. It being inquired by the bishop of Exeter, whether there might not be a greater degree of cold, when it does not freeze, or when the thermometer is most sensible of it, than when it does freeze; Mr. BOYLE suggested the following experiment,

Take a thermometer, and observe what degree it stands at, when the water just begins to freeze; and then see, whether at any time it falls lower, and the water freezes not.

SIR ROBERT MORAY mentioned, that the King had made an experiment of cold, with three glasses filled with sweet water, used for washing, one glass bigger than the other, taken out of a trunk by the King's barber, and freezing, after they had a very little while been opened, first at the top, and then with shootings of ice to the bottom, and so congealing together.

Mr. HOOKE produced his thermometrical standard for heat and cold, and gave an account how it had been made, viz. after the manner described. This was looked upon, though not exact, yet better than the other ways hitherto used.

The

Mr. OLDENBURG produced two printed papers, one sent him from France, intitled *Le Journal des Sçavans*, lately begun to be published¹ at Paris, containing such matters as pass in the commonwealth of learning. Notice was particularly taken of the account contained in this Journal² concerning Signior GIUSEPPE CAMPANI's book of his new optic glasses³ made by a turn without a mold, and the new discoveries made thereby in JUPITER and its Sarellites. The other paper came from a physician at Hamburgh, named JOHN DANIEL MAJOR, inclosed in a letter to the secretary, concerning the invention of injecting liquors into the veins of animals, which the author pretends to have been lighted upon by himself before he knew what had been done in England concerning it. The author having, with great respect to the society, desired the favour of their communicating to him what experiments had been made in England by means of this invention; it was ordered, that the secretary should thank him for his civilities, and acquaint him, that one of their members having made a considerable number of experiments of that kind, intended to publish them soon.

Dr. WILKINS produced a letter written to him from Dr. POPE, dated at Venice Sept. 2, 1664, about the mines of mercury in Friuli, viz. how the mines are ordered; how this mineral is digged, of what colour, hardness, and weight it is; how it is got out of the ore; what engines are used; and what accidents befall the labourers, &c. The same letter contained likewise a description of the contrivance of blowing the fire in the brass works of Tivoli, where the water blows the fire, not by moving the bellows, but by making wind. It was ordered, that this letter be entered in the letter-book⁴; and that Mr. HOOKE consider of the engine mentioned in it to produce air by the fall of water.

January 18, at a meeting of the COUNCIL were present,

The lord viscount Brouncker, preside^t
 The lord bishop of Exeter
 Sir ROBERT MORAY
 Sir PAUL NEILE
 Mr. AERSKINE
 Dr. WILKINS
 Dr. GODDARD

Dr. CLARKE
 Mr. HENSHAW
 Mr. PALMER
 Mr. COLWALL
 Mr. HILL
 Dr. BALLE
 Mr. OLDENBURG.

Dr. WILKINS made a report from the committee appointed December 21, 1664, to consider of certain papers to be inserted in the History of the Society, viz. that the committee had met, and looked over a number of papers, as appeared by a list; and that they had thought good, that such papers might be referred to the respective authors thereof, to review them before they were printed, seeing they were to be published with their names prefixed thereunto.

¹ The first was published on Monday 5 Jan. 1664, N. S.

² P. 11. Edit. Amsterdam, 1679.

³ Printed at Rome in 12mo, under the title of

Ragguaglio di nuove Osservazioni da GIUSEPPE CAMPANI.

⁴ Vol. I. p. 139. It is printed in the Philos. Transact. n^o ii. p. 21, for April 1665,

It was ordered, that such papers, according to the said list, be referred and reviewed, and then delivered to Mr. SPRAT to insert them; and before they were printed, to present them to the perusal of the president: And

That Mr. HILL take care of having drawn out of the general list of the proposers of candidates the names of every such proposer, together with the names of those who were thus respectively proposed by them; in order that the persons proposed might be minded of their payments by their proposers.

Mr. HOOKE having made a proposition of giving the discovery of the longitude, as he had conceived it, to the society, it was ordered, that he should choose such persons to commit this business to, as he thought good, and make the experiment; that by such persons chosen, the council might be satisfied of the truth and practicableness of his invention, and proceed accordingly to take out a patent for him.

It was ordered, that Dr. WILKINS meet the first time (at least) with the committee for improving the English tongue; and that particularly he intimate to them the way of proceeding in that committee, according to the sense of the council, viz. chiefly to improve the philosophy of the language: And

That the printing of Mr. HORROX's papers be considered at the next meeting of the council.

At the meeting of the SOCIETY on the same day,

The duke of ALBEMARLE, proposed by the president, was elected honorary member: And

The lord viscount STAFFORD, proposed by Sir PAUL NEILE, was elected.

Dr. POWER's letter, concerning his observations of the comet, was read.

Dr. WALLIS's letter, concerning the comet^s, and his extracts out of Mr. HORROX's letters, were read.

Dr. PELL suggesting, that there would be an eclipse of the moon on the Saturday following, it was desired, that as many of the society, as had conveniency, would observe it.

There was made an experiment to shew, that it was not the agitation of the burning body, that continued it burning. There was put a chafing-dish with kindled coals in it into a glass covered, and having been a little while in it, they went out, nor would any agitation of the chafing-dish revive them.

Then there was included a chafing-dish, with burning coals, into a long square wooden box, with a pair of bellows (according to Mr. BOYLE's former suggestion)

^s Dated at Oxford, December 24, 1664, Letter-Book, vol. i. p. 218.

that were so fitted within, as to blow the air upon the coals: and after the bellows had been exercised 10 or 12 minutes, the coals went out, nor could they be revived by any blowing of the included air upon them; but as soon as fresh air was admitted, and the bellows plied, the coals recovered their burning.

The president desired, that these experiments having answered what had been said for the agitation of the air as necessary to burning, an experiment might be made to shew, that it was not the filling of the pores of the air with exhalations, and the rendering it thereby unable to receive more of them, that made it go out.

Sir ROBERT MORAY inquired, whether the compression of the air might not cause the extinction of the fire? and he suggested an experiment to be made in the compressing engine, by putting a flaming or a glowing body into it, and by crowding a good quantity of air upon it, to see the effect thereof upon such bodies.

Mr. HOOKE was of opinion, that as air much rarefied, wherein the parts are enlarged, was found to make burning bodies go out, so condensed air would keep them longer alive.

Mr. BOYLE suggested these experiments: 1. After the air will suffer coals to burn no longer, to try to kindle, or to reduce to smoke, combustible matter, by casting in the sun-beams with a large burning-glass; and among other combustibles, to be sure to try the experiment with finely powdered coals of the same kind with those that went out, to prevent objections. And when the sun-beams cannot be thrown in, then to let fall a red-hot iron (kept suspended till the just time, that the coals are gone out) upon the materials, from which the smoke is to be raised. 3. To distil finely beaten charcoal with a very strong naked fire, to see what it will afford, and so to be instructed of the truth of what is affirmed by some, that such coals will afford no more steams.

Mr. HOOKE desired, that some experiments might be suggested, that were thought not solvable by the hypothesis of fire proposed by him.

Sir ROBERT MORAY moved, that Mr. BOYLE, who had long since considered this subject of fire, and flame, and heat, might give the society his thoughts thereof. Upon which Mr. BOYLE said, that four or five years before he had made the consideration of this subject a part of his business, but did not know, whether his present studies of other matters would give him leave to review what he had then written.

Sir ROBERT MORAY mentioned, that he had recommended to Mr. BOYLE to try by several ways, as by distilling and boiling, what could be extracted out of Scots coal, himself having seen a kind of bituminous and pitchy substance drawn out of them.

Mr. BOYLE proposed a way to separate the salt out of sea-water, by freezing it; viz. to put sea-water in broad pans to be frozen, and to take off from time to time

time the ice; which being thawed by itself, and hydrostatically compared with the weight of an equal bulk of the remaining brine, would shew by the difference of weight, how much is gained by this experiment.

Sir ROBERT MORAY produced a discourse concerning coffee, written by Dr. GODDARD at the King's command; which was read, and the author desired to leave a copy of it with the society.

Dr. MERRET moved, that torrefied pease might be distilled, to see what they would afford.

Mr. BOYLE mentioned, that he had been informed, that the much drinking of coffee produced the palsy.

The bishop of Exeter seconded him, and said, that himself had found it dispose to paralytical effects; which however he thought were caused only in hot constitutions, by binding.

Mr. GRAUNT affirmed, that he knew two gentlemen, great drinkers of coffee, very paralytical.

Dr. WHISTLER suggested, that it might be inquired, whether the same persons took much tobacco.

January 25, at the meeting of the COUNCIL were present,

Dr. WILKINS, vice-president
Sir ROBERT MORAY
Sir PAUL NEILE
Sir WILLIAM PETTY
Mr. AERSKINE
Mr. PALMER

Dr. CLARKE
Mr. COLWALL
Dr. CROUNE
Dr. BALLE
Mr. GRAUNT
Mr. OLDENBURG.

It was resolved, that the business of procuring benefactors, and the manner of well managing the same, should now be begun to be seriously considered of.

At the meeting of the SOCIETY on the same day,

The lord viscount STAFFORD was admitted.

FREDERICK ALBERT duke of Brunswick was present at the meeting, and subscribed himself fellow of the society.

It was ordered, that Mr. HOOKE bring in his observations of the late eclipse of the moon on the 21st instant: And

That he peruse Mr. STREET's appendix to his *Astronomia Carolina*, and give an account of it to the society.

The persons, to whom were recommended pieces of the copper-stone, brought in at the meeting of the 11th instant by Sir ROBERT MORAY, to whom it had been sent out of Nova Scotia, being called on for an account of what they had done with it, it was said by Sir ROBERT MORAY, that Mr. SLINGESBY had extracted good copper out of it; but Col. LONO and Dr. CROUNE, who were the two other persons, that had taken pieces of this stone, were not yet ready with their account.

The experiment of including a chafing-dish, with burning coals, in a wooden box, and of blowing, with bellows, the internal air upon them, was repeated with the like success as formerly.

In order to see, whether the compression of the air caused the extinction of fire, there was put a lamp into the condensing engine; and a great quantity of air being crowded into it, it was found, that the lamp burnt in that compressed air about 15 minutes; whereas in the uncompressed air in the same engine, it burnt not above 3 minutes.

It was ordered, that at the next meeting an experiment should be made, of filling a vessel with smoke, to see, whether a candle put into it would burn as long therein, as it would do in the same air without smoke.

It was likewise ordered, that a fusée should, against the next meeting, be prepared of salt-petre and coal, to see how long it would continue burning in a close vessel.

Dr. ENT suggested, that some animal and a burning candle might be included together in a close glass-vessel, to see, whether they would live one as long as the other.

The experiments suggested at the preceding meeting by Mr. BOYLE were recommended, two of them to the curator of the society, and the third to Dr. GODDARD.

Mr. NEILE suggested, that it might be tried, whether air considerably compressed contributes to freezing.

Dr. CLARKE related, that making a decoction of several bitter roots, as scorzonera, aristolochia, gentian, carduus benedictus, &c. in frosty weather, he found the next morning, that the ice formed at the top of the decoction had lost all the bitter taste, which the liquor had before; but that what remained liquid under the ice, was very bitter; and that the tincture was seen towards the bottom.

It was ordered, that if the weather served, there should be more experiments made of this kind, to see whether liquors, that have imbibed bitter and salt qualities, will lose them by freezing.

The operator produced two glass-bottles with small beer, both drawn out of the same vessel, that had been in part frozen. The one being of the beer, that remained unfrozen, was high-coloured and strong; the other drawn out of the same vessel, after the beer was thawed, pale and very flat.

There was read a letter from Dr. WALLIS to Mr. OLDENBURG, dated at Oxford January 21, 1667¹, containing several observations of his upon the comet, and upon Mr. HEVELIUS's and Mr. HORROX's hypotheses concerning the nature of comets in general.

In this letter the doctor observes, that the hypothesis concerning the motion of comets, which Mr. HEVELIUS seemed to look upon as first discovered by himself, was only that, which others before him had conjectured; viz. that the true way of a comet is a strait line, which being a tangent to a circle is at the point of contact nearest to us; and as it is farther from that point, seems to move slower, and appears less. "The apparent motion, adds Dr. WALLIS, will be estimated according to a line of tangents. What variation it hath from such a position, may arise from the earth's change of place. How far the calculation he [Mr. HEVELIUS] gives, or the observations of this comet's motion appear to justify that hypothesis, I have not yet taken time to examine. But since conjectures about such hypotheses be now stirring, I thought it not amiss to revive that of Mr. HORROX, which I find among his papers. In some of his letters to Mr. CRABTREE, he intimates his conjecture of their issuing forth of the body of the sun by a strait line. Afterward, upon examining the motion of some comets, he addeth to that of their coming from the sun's body some curvity of motion arising from it. At length he seems to have pitched on such an hypothesis, as the figure inclosed represents, making it issue out of the sun's body, and by an elliptical figure (or near it) to return thither again; according to which he hath traced the motion of that in *anno* 1577, (according to TYCHO's observations, as I suppose.) But this paper being his own hand, and (for ought I see) all that is remaining concerning this hypothesis, I desire, that it be carefully preserved. I can pass no judgment of the hypothesis concerning the truth of it; but, if it answer observation, it is very ingenious."

February 1, Dr. MERRET produced some white mucilaginous substance, like that which is called star-fall, with some little black spots intermixed like eggs; which evidently came out of a frog's belly, that had been killed by a crow, having one of its legs torn off, and a little hole made in her belly, out of which the matter issued.

¹ Letter-Book, vol. i. p. 220.

He produced likewise the seeds of a fungus, which had been looked on in the microscope, and appeared uniform seeds. Dr. MERRET and Mr. HOWARD were desired to make trial of these seeds by sowing them.

Dr. WREN produced some observations of the comet, with a theory.

The president communicated a letter from the earl of Sandwich containing some observations of the comet, which were referred to Dr. WREN and Mr. HOOKE.

Col. THOMAS BLOUNT of Greenwich was proposed candidate by Dr. WILKINS.

A box was produced by Mr. GRAUNT of a very light, soft consistence, like the finer part of cork.

An experiment was tried with a burning lamp, placed in the condensing engine, and suffered to continue in the ordinary air included in the receiver uncondensed, for three minutes. The lamp being then taken out, was, after the fatiated air of the receiver had been blown out, put in again, and closed up, and new air being continually forced in, the lamp, upon such forcing in of the air, was found to continue burning 17 minutes; and about a minute after the pumping ceased, the lamp went out, having continued burning after its inclosure 18 minutes.

Mr. BOYLE moved, that spirit of wine might be tried, whether it would burn in the exhausted receiver.

February 8, the experiment of burning charcoal in a close receiver was again tried, which continued fired not above one minute and a half.

The like experiment was tried with a bird put into the receiver, together with a chafing-dish of coals, upon the extinction of which, about the same time, the bird also began to die, but being let out into the open air, recovered.

An experiment was made of trying to kindle fine powder of charcoal, put into a close glass receiver, with a large square piece of iron heated red-hot, and let down upon it, within the receiver, according to Mr. BOYLE's late suggestion. After a small chafing dish of coals had been suffered to burn and go out in the said receiver, it was found, that the red-hot iron lay on the top of the charcoal-powder, without kindling or firing of the powder at all; till by opening the cover of the receiver, and thereby admitting the external air, it began to kindle all about the iron, and to smoke and burn apace.

Mr. BAGNALL produced a bag-full of *lapis amianthus* or *asbestos*. He was desired to procure more of it, in order to the making of paper, which he promised to endeavour; and Mr. HILL was desired to take care of making this paper, when the stones were procured.

EDWARD earl of Clarendon, lord high chancellor, being put to the ballot, was unanimously elected. Col. BLOUNT was likewise elected and admitted. Mr.

SAMUEL PEPYS, esq; was proposed candidate by Mr. POVEY.

Some observations concerning the comet from Monsieur BEAUFORT, brought in by Sir ROBERT MORAY, were by order delivered to Mr. HOOKE, and to be communicated to Dr. WREN.

Dr. WILKINS was desired, upon the reading of a letter from Dr. WALLIS, to speak to Dr. WORTHINGTON, to procure what papers he could of Mr. CRABTREE, especially, if it might be, his Diary of Observations.

Another letter was read by Mr. OLDENBURG from RICHARD REED, esq; signifying his sending a parcel of red-streak grafts.

A pipe red-hot, and lying in a chafing-dish, being blown through, did not emit any visible flame, but burnt a paper held close to it.

A letter was read by Capt. GRAUNT from Sir ANDREW KING, accompanying a present to the society of two load-stones, and three several kinds of earth.

Dr. HOARE produced a white body, brought from the Alps, said to be petrified snow; which Mr. HOOKE was desired to view in the microscope.

He produced likewise the body of a frog, when the flesh was turned into a mucilage; and a ball of hair taken out of the stomach of a cow.

February 15, PHILIP CARTERET, esq; eldest son of Sir GEORGE CARTERET, was proposed candidate by Dr. CLARKE. And

Mr. PEPYS was unanimously elected, and admitted.

Dr. CHARLTON produced a fowl, called the true merganser, with a description of it in Latin, which was ordered to be filled up.

He likewise reported, that he took out the trachea of the said fowl, which being an extraordinary diver, he found in it a receptacle for air, about the entrance into the lungs, in a triangular form, with small muscular fibres about it.

Dr. CLARKE observed, that he had found something like this in drakes, but could never see any in ducks.

A letter to the president from Monsieur BOREEL was read, containing an account of a very strange cure of a wound in the lungs; which was ordered to be entered into the Letter-Book^o, and was as follows:

^o Vol. I. p. 234.

" My Lord,

London, Jan. 27, 1664.

" **T**O obey your commands, I have set down in writing, the relation of an extraordinary cure performed by Monsieur SUIR in Paris; and I humbly beg your lordship's pardon for the ill terms and expressions it is in, I being born a stranger to this tongue, and a very backward apprentice in it.

" Monsieur de BOTAQUET, a gentleman born in Normandy, was a captain in the service of the United Provinces. He did fight a duel at Delft in Holland, and was run in his breast at the right side. When he received the wound, he fell down, so that his party thought him dead, and fled immediately. The chirurgeons in Holland did what their skill afforded, and did afterwards shut up the wound, so that the patient did go abroad to his functions. But some good while after this, he did grow very weak; the flesh of his body wasted away visibly every day, so that the physicians and chirurgeons in Holland could say nothing to it, and his friends did advise him to go to Paris, which place did afford very extraordinary cures; which the patient did, and addressed himself to Monsieur SUIR, a renowned chirurgeon living in the reign of King Lewis XIII. who being exactly informed of the circumstances of the accident, and the remedies formerly applied to the wound, told the gentleman, he would undertake to cure him, if he would exactly observe what he should prescribe; but withal, that he could not undertake to cure him, except the said patient would undergo to endure at sixteen several times, at every time, as much pain as a man suffers, that is broke alive upon the wheel: That his life was lost surely, except he did undergo this; and it being a thing worth the patient's consideration, he, the said chirurgeon, did give him an hour's time to consider of it. In the mean time he went to visit another wounded patient. When he returned, the said Monsieur de BOTAQUET declared his resolution to undergo the torment. Whereupon Monsieur SUIR took him into his house, did apply some preparatory upon the place, where the sword formerly entered, and after two days made a square opening in the right side of his breast, of that bigness, that he could conveniently put in his hand, cutting two ribs, and singed the bones immediately after the cutting. After which, the said chirurgeon finding the patient's lungs in the worst condition by putrefaction corrupted, pulled them toward the said opening, and did cut off with scizzars all that was corrupted, inasmuch that he took off the greatest part of the lungs, for the sword had hurt the lungs very near in the highest and thickest place, and all, that was under the wound, was corrupted: Which being done, and having applied to the lungs such things he thought fit, he left the patient till the next day, at which time he handled the said lungs with his hands, as if it had been any exterior limb of the body, and so continued for thirteen days, at which time the inward parts did grow so sensible, that the patient did declare it impossible for him to endure it any longer, and was resolved rather to die than to suffer the said torment longer; but was persuaded by his friends, divines, and the said Monsieur SUIR, to endure the operation.

" The

" The sixteen days being past, the chirurgion did not touch the inwards any more, and the opening in his side was shut up, which required some time, and the patient did constantly wear a piece of silver plate upon that place.

" The said patient was afterwards in good health, lived as he had done before, fed hard: his humour was the same as formerly, being of a continual merry disposition. He did all his functions in his place, and had no inconvenience of this accident, except, that he was something short-winded, which nevertheless did not hinder him in performing any of his actions. He lived some ten years, or thereabouts, after this cure, and died of a fever; but I could never hear, that this cure was suspected to have any ways occasioned his death.

" There are many gentlemen at the Hague, and elsewhere, that can witness this; and I myself have for many years frequented his company, and had the above-mentioned particulars from the patient's own mouth.

" And so I rest

" Your lordship's most humble and obedient servant,

" BOREEL."

Mr. Hooke made an experiment with charcoal inclosed in a glass, to which nitre being put, and the hole suddenly stoped again, the fire revived, though no fresh air could get in.

Mr. BOYLE affirmed, that gun-powder burns very well in a receiver, out of which the air has been extracted.

He likewise affirmed, that tin mixed with nitre, and Mr. Hooke added, that filings of iron mixed with it, would kindle it. It was ordered, that the experiments should be made.

A quantity of *ysso* or *gypsum*, sent by Sir ANDREW KING out of Spain, was produced.

Col. BLOUNT reported, that the glass-houses give over working in summer-time. The reason of which was doubtful, whether because the workmen could not bear it, or that the fire was not sufficient. He added, that the workmen were, to his knowledge, desirous to continue working.

It was ordered, that Mr. Hooke make trial with a flaming body, and a body heated without flame, whether the heat and flame are preserved best in hot or cold air.

Mr. Hooke made an experiment of gun-powder burning without air.

It

It was ordered, that a sealed weather-glass be made of thicker glass, to be inclosed in the compressing-engine, to see, whether any alteration would be made in the liquor.

Mr. BOYLE produced a letter containing a relation of a monstrous calf, which was ordered to be registered *.

Mr. WILLIAMSON communicated two observations of the late comet, made at Madrid.

Sir ROBERT MORAY moved, that Mr. HOOKE's lecture might be perfected and printed; which was assented to.

Kindled charcoal inclosed in a receiver, without exhausting the air, went out in one minute; and upon the experiment's being repeated, it continued 1'. 20".

Dr. WILKINS moved, that Dr. CHARLTON be put in mind of his obligation to bring in the anatomy of fowls and fishes.

It was ordered, that a body be procured the next sessions, and that Dr. CHARLTON endeavour to get a meeting of some physicians of the society, in order to consider of experiments and inquiries:

That Sir Edward HARLEY, Mr. HAAK, Col. BLOUNT, and Dr. PELL, be added to the committee of agriculture, and Col. BLOUNT to the mechanical committee: And

That Mr. HOOKE's experiment of the resistance of air passing into small holes, be tried.

February 22, Mr. PHILIP CARTERET was elected.

The duke of Brunswick sent, by one of his gentlemen, two cuts of the late comet, as it was seen at Augsbourg and Nuremberg, in Germany; as also a cut of a strange sea-monster taken upon the coast of China; all which he desired might be returned to him.

There was tried an experiment with a common sealed weather-glass placed in the condensing-engine, with a gage in it; and the air being considerably compressed, the liquor in the thermometer was not found to rise sensibly.

Another experiment was made to try what strength was requisite to force the air into the bores of small pipes filled with water; or how much of the pressure of the air is taken off by its ingress into smaller and smaller holes; and it was found, that the smaller holes required the greater force to drive in the air, and to force out the water.

* It does not appear in the Register, but is printed in the Philos. Trans. n° i. p. 10.

There was also made an experiment with nitre, put in an earthen crucible upon the fire; and sulphur being cast on the top of it, it gave a very bright vivid flame.

The president opened a packet addressed to the society, containing a printed discourse of Monsieur de SORBIERE upon the late comet, with a Latin letter from him to the society dated at Paris, February 13, 1667, N. S. °. The letter being read, Mr. OLDENBURG was desired to peruse the discourse, and give an account thereof to the society at their next meeting; after which the council would consider what return to make to the author.

Sir ROBERT MORAY produced the picture of a certain Indian plant, called Nissy, sent him by Sir PHILIBERTO VERNATI from Batavia in Java, from whom Sir ROBERT was desired to procure a description of the qualities of this plant.

Mr. OLDENBURG produced an account sent from Italy concerning the effect of the new optic glasses of CAMPANI tried upon several characters. He was desired to translate it into English against the next meeting, and the president, Sir ROBERT MORAY, and Mr. HOOKE to think upon a fit place to make the like observations in, with glasses made in England of about the same length with those of CAMPANI.

Mr. HOOKE gave an account of a dog, that died, after the spleen had been taken out; affirming, that he had seen a kind of glandule grown on to a piece of the spleen, that was left; and that the liver and cawl were altogether putrefied.

It was ordered, that another dog should be thus cut by Dr. CHARLTON, at a convenient season; as also, that Dr. CLARKE should be desired to join with Dr. CHARLTON in cutting out the spleen of another dog, without tying up the vessels.

Mr. BOYLE proposed these following experiments; 1. To put an iron crucible into a receiver of his pneumatic engine, and, as soon as the receiver is well exhausted, to cast flower of brimstone upon it, to see whether it will flame. 2. To try how the spirit of wine burns in the same engine. 3. To try, whether bodies resolved by the fire in vessels exhausted of air, will yield the same substances, to wit, oil, salts, spirits, and phlegm, as to number and qualities, as they do in those ordinary vessels, wherein what is not filled by the body to be distilled is taken up by air. This he proposed might be tried by a solid piece of competently heated silver, or with iron suspended in an exhausted receiver, wherein bodies of a loose texture, and easily resolvable (as cork, wax, camphire, amber, &c.) may be nimbly applied. This he conceived to be the rather worth trying, because it appeared from common foot, that there may be great odds, upon the account of the air, between bodies resolved in different ways; since vegetables, reduced in the open air to frost, yield a considerable quantity of a volatile salt, like that of hartshorn and other animal substances, whereas in common distillations he had not yet found them to yield one grain of any such salt.

* Letter-Book, vol. i. p. 239.

Mr. HOOKE produced a new small quadrant contrived by himself, to make, by the means thereof, both celestial and terrestrial observations with more exactness than by the largest instruments, that had been hitherto publicly known. This quadrant was only of 17 inches radius, being by the contrivance of a small roller, that moved upon the limb of it, made so accurate, that each degree was actually distinguished into 60 minutes, each of which minutes being about one third of an inch long, was actually divided into six parts, denoting every 10 seconds in a minute. The sights were likewise so contrived, though but short, as to be no less curious in distinguishing the parts of a minute in the visible object. The perpendicular also of the quadrant was so contrived, that, though it exceeded not much three feet in length, yet it could be adjusted, by the means of an index, so exactly, as if it were 60 feet long.

March 1, at the meeting of the COUNCIL were present

The lord viscount Brouncker, preside
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE
Dr. WILKINS

Dr. CLARKE
Mr. PALMER
Mr. COLWALL
Mr. OLDENBURG.

It was ordered, that four or five hundred tickets be printed for demanding the arrears of the fellows of the society, leaving blanks for the time and the respective sums: And

That the *Philosophical Transactions*, to be composed by Mr. OLDENBURG, be printed the first Monday of every month, if he have sufficient matter for it; and that that tract be licensed by the council of the society, being first reviewed by some of the members of the same; and that the president be desired now to license the first papers thereof, being written in four sheets in folio, to be printed by JOHN MARTYN and JAMES ALLESTRY, printers to the society¹.

At the meeting of the SOCIETY on the same day,

¹ The first number of the *Philosophical Transactions* is dated Monday March 6, 1663, and contains 16 pages in 4to. At the end of it, it is said to be printed with licence. The introduction of Mr. OLDENBURG, the editor, is in these words: "Whereas there is nothing more necessary for promoting the improvement of philosophical matters, than the communicating to such, as apply their studies and endeavours that way, such things, as are discovered or put in practice by others; it is therefore thought fit to employ the press, as the most proper way to gratify those, whose engagement in such studies, and delight in the advancement of learning and profitable discoveries, intitle them to the knowledge of what this kingdom or other parts of the world do from time to time afford,

" as well of the progress of the studies, labours, and attempts of the curious and learned in things of this kind, as of their complete discoveries and performances; to the end, that such productions being clearly and truly communicated, desires after solid and useful knowledge may be further entertained, ingenious endeavours and undertakings cherished, and those, addicted to and conversant in such matters, may be invited and encouraged to search, try, and find out new things, impart their knowledge to one another, and contribute what they can to the grand design of improving natural knowledge, and perfecting all philosophical arts and sciences; all for the glory of God, the honour and advantage of these kingdoms, and the universal good of mankind."

Sir

SIR NICHOLAS SLANNINO and Mr. PHILIP CARTERET were admitted.

There was an experiment made to try, whether sulphur cast upon heated nitre would burn without air, by putting nitre into an iron crucible red hot, and inclosing it in the rarefying engine, whence the air being well exhausted, (which appeared by the sucker's going down almost to the bottom) the sulphur, which thereupon by turning of the stop-cock was let fall upon the nitre, was seen to flame as freely, as if it had been in the open air.

The other experiment appointed for this day, of burning spirit of wine in the same engine, was referred to the next meeting; and Mr. HOOKE was ordered to devise more experiments to elucidate the nature of fire and burning.

A letter of Monsieur HUYGENS to Sir ROBERT MORAY, dated at the Hague, Feb. 27, 1667, N. S. * was read, giving notice, 1. Of his instructions printed in Dutch for pilots, about the use of his pendulum watches at sea. 2. Of an odd kind of sympathy perceived by him in these watches suspended by the side of each other. 3. Of his agreement with Dr. WREN about the place of the comet. 4. Of his opinion concerning Monsieur de SON's chariot, together with his thoughts of one of his own devising.

It was thought proper hereupon, 1. That the said instructions should be compared with those of the president, to have them printed in English. 2. That the president and Sir ROBERT MORAY should be desired to think upon and make some experiments, to find out upon what account this pretended sympathy should happen; whether from a magnetical cause, or from the agitation of the air; and, among other things, to observe, whether pendulums, that go alike in any clock-work, go together, hanging near to one another; as also, whether three or four watches do the same, that two do. 3. That Mr. HOOKE should extract out of his lecture a discourse upon the late comet, and fit it for the press, together with the necessary schemes. 4. That Col. BLOUNT having given several good hints for improving carriage, and particularly for trying experiments about chariots by weights, should be desired to bring in, after more trials upon this subject, a model of his conceptions about it.

Mr. EVELYN's paper, intituled, PANIFICIUM; or the several manners of making bread in France, &c. where by general consent the best bread is eaten, was read, and ordered to be registered'. And the author having suggested, that some good English oeconomical persons might be consulted for the best of English bread, biscuits, and cakes; and also that Dr. KUFFLER might be desired to give a perfect description of his new oven, both stationary and portable; the first was recommended to those, who had opportunity of consulting with such persons for making of the best English bread, and particularly to Col. LONG; the other was recommended to Mr. BOYLE.

* Letter-Book, Vol. i. p. 255.

' Register, Vol. iii. p. 72—78.

Sir ROBERT MORAY proposed, that it might be thought upon, how to make bread without yeast; as also how to keep yeast all the year.

Col. BLOUNT suggested, that furz-bushes rolled in yeast make the yeast keep all the year.

Dr. CLARKE affirmed, that some good country house-wives beat together salt, whites of eggs, and flour, to make it serve instead of yeast both for bread and beer.

Dr. PELL seconded this, by affirming, that a little flour and the white of an egg beaten together with a little of the first wort will ferment a whole brewing.

Dr. WILKINS mentioned, that Mr. GRAUNT had received a good account of the poison of Macassar, and the effects of the same; rectifying withal a part of the common stories made thereof; and that he had got some of the poison itself, which he intended to produce before the society.

The Italian account concerning the performances of the optic glasses of CAMPANI upon certain characters being produced by Mr. OLDENBURG in English, it was ordered, that the president, Sir ROBERT MORAY, Col. LONG, Mr. HOOKE, and as many more as could conveniently, should meet on the Thursday following at night in Westminster-hall, and try some English glasses of Mr. REEVES's making of the same length upon the same characters, observing the circumstances prescribed in the paper concerning distance, light, &c.

The president, Sir ROBERT MORAY, Dr. WILKINS, and Mr. EVELYN were desired to view a place near Col. BLOUNT's house at Deptford, fit to try experiments of carriage, &c. there being a couple of workmen very fit to make and mend what might be found necessary for such trials.

March 8, the experiment of flaming spirit of wine, as it was proposed by Mr. BOYLE, included in a receiver of the pneumatic engine, was made with this success, that the said spirit was extinguished in the receiver exhausted in 9 seconds; in the unexhausted it kept burning 24 seconds.

The experiment with-nitre and filings of tin, suggested likewise by Mr. BOYLE, was also made; and the filings of tin cast upon the nitre over a fire made it flame; though it was not known, that any sulphur ever was extracted out of tin; which seemed to infer, that there are bodies combustible, that are not sulphureous.

Dr. WILKINS proposed, that the following experiment of Dr. WREN's suggestion might be made; viz. to put a fermenting liquor in a glass ball, to which a stop-cock should be fitted, and to tie a bladder about the top of the stop cock; by which means a certain air generated by the fermenting liquor would pass into the bladder, and upon the turning of the stop-cock be kept there in the form of air.

air, without relapsing into water. This or the like experiment was ordered to be tried at the next meeting.

Mr. HOOKE mentioned several liquors, that by their working upon one another would generate an air; viz. oil of tartar, and vitriol, spirit of wine and turpentine, &c.

Dr. CHARLTON affirmed, that rynkower wine and gall put together would presently ferment.

Col. BLOUNT affirmed, that almost all greens put into wines would revive them, by putting them into a new fermentation; and he named angelica in particular for that purpose. He added, that oyster-shells pounded and put into wine would make it ferment.

Mr. GRAUNT produced a box of Macassar poison, which was ordered to be tried at the next meeting, by dipping a needle in the poison, and pricking some dog, or cat, or pullet with it.

He produced likewise a sort of small nuts, which he affirmed to have been taken in a Spanish ship, coming from the West-Indies some years before; promising to procure more of them, in order to examine what they were.

There was read a letter of Monsieur HUYGENS to Sir ROBERT MORAY, from the Hague, dated the 6th of March, 1667, N. S. *; containing, first, his desire of being more particularly informed about the pendulum watches committed to Major HOLMES; and a rectification of a mistake concerning a certain sympathetic agreement, produced in such watches by the motion of two chairs.

Occasion was taken here by some of the members, to doubt the exactness of the motion of these watches at sea, since so slight and almost insensible motion was able to cause an alteration in their going.

There being also mention made again of Major HOLMES's relation of the late performances of the pendulum watches in his voyage to Guinea, it was affirmed by several of the members, that there was an error in that relation, as to the island named therein; and that it was not the island of Fuego, which the Major's ships had touched in order to water there, but another thirty leagues distant from it. Mr. PLEYS was desired to visit the Major, and to inquire farther concerning this particular for the satisfaction of the society.

Dr. MERRET produced an ox-bladder, which was double, having a partition and two ureters, into which water being put, it remained distinct in each bladder, but ran out of one hole, into which both the ureters terminated.

* Letter-Book, vol. i. p. 157.

Dr. CHARLTON mentioned, that a little quantity of viper's flesh put into a fermenting liquor would presently stop the fermentation, and keep the liquor quiet for a pretty while. He added, that in making of viper-wine, he never observed any fermentation, though the air was excluded from it.

Mr. HAAK related, that he had put some young live vipers into a bottle with Malaga wine, which, though not full at first, became full after a while; whereupon untying the string of the stopper, the cork burst out against the ceiling of the room, three of the vipers following after it; the rest he kept still in the bottle unconfined.

Col. BLOUNT proposed the improvement of the French chariot, by taking off the burthen from the horse, by means of two small wheels before, retaining the long springy boards.

Mr. HOOKE suggested, that for the convenience of turnings, the springs might be doubled, and so made shorter, whereby the rider would have ease, and the chariot turn in any street conveniently.

March 15, Mr. DANIEL COXE was proposed candidate by Dr. WILKINS.

The experiment proposed by Dr. CHARLTON of mixing rynekower wine and ox-gall together, for a present fermentation, was tried, but succeeded not.

The experiment of generating air was made after this manner. There was taken a common glass-vial, with two pipes, and some pounded oyster-shells and aquafortis; and as soon as the aquafortis was by one of the pipes poured in upon the powder, and the hole stoppt with a piece of hard cement, the exhalation caused by the corrosion of the shells by the aquafortis, in a very little time blew up the bladder (tied on the other pipe) so as to swell it with air very plump: which expansion remained till the rising of the society, when the vessel in that posture, was locked up in the box of the watch, to remain there till the next meeting.

Dr. WREN made use of this experiment to explain the motion of the muscles by explosion.

There was also taken a bottle, containing strong ale, which had been bottled a while, and over the bottle's mouth was tied an ox-bladder, out of which the air was squeezed: after which, by loosing the cork by degrees, the air was blown into the bladder by the expansion of the fermenting liquor within, and the bladder was almost half filled with an aerial spirit, generated by the working liquor.

Mr. BOYLE suggested, that this experiment was capable of improvement for the producing of air under water; and he mentioned coral or oyster-shells and distilled vinegar, as wholesome substances for that purpose. He moved, that an animal might be put into a receiver of his engine, and the air exhausted till the creature

creature grew sickly; and that then some new air might be produced in the receiver by a contrivance of making distilled vinegar work upon coral, to see, whether by this means the animal could be revived.

Dr. WILKINS moved, that at the next meeting the air generated by the mixture of aquafortis, and the pounded oyster-shells, might be blown into a dog's or cat's mouth, in order to see what would be the effect of it.

The experiment of trying to poison a dog with some of the Macassar powder, in which a needle had been dipped, was made, but without success. It is to be remarked, that this was done with the poison, as it was returned by Dr. CHARLTON, who had taken it away to his house, contrary to the order of the society; for which fact the operator was ordered to summon him to attend the society at their next meeting, that he might be heard, before any thing be declared against him for this action.

Mr. PEPYS gave an account of what information he had received from the master of the Jersey ship, who had been in company of Major HOLMES in the Guinea voyage, concerning the pendulum watches, viz. that the said master affirmed, that the vulgar reckoning proved as near as that of the watches, which, added he, had varied from one another unequally, sometimes backward, sometimes forward, to 4, 6, 7, 3, 5 minutes; as also that they had been corrected by the usual account. And as to the island, at which they had watered, the said master declared, that it was not Fuego, but another 30 miles distant from the same westward.

Sir ROBERT MORAY reported hereupon the substance of Major HOLMES's relation, rectifying some mistake in the number of the leagues, formerly mentioned to have been 400 or 500 in steering the course from the west to the north-east, and affirming, that it was but about 200 leagues: but the course from Guinea westward had been 800 leagues. He added, that though they had not watered at Fuego, yet they had made that island at the time, which the Major had foretold, and were gone from thence to another, more convenient, for watering. He mentioned also, that the Major had repeated his promise to him, of giving the whole history in writing, as soon as he could have leisure for it; and that in the interim he had related to Sir ROBERT two experiments more, made by him in the same voyage. The one was, that having sailed fifty or sixty leagues from the coast of Africa westward, and being come back again to the same place, he found the watches agree with the sun, just as they did when they departed thence. The other was, that having quitted the Equinoctial Line, to seek the coast of Africa, seven or eight degrees; and the wind becoming scanty, and continuing so for several days, whereby they were driven after about eighty leagues eastward, which the pilots of the other ships did not perceive, he discovered it by the watches. Which shewed, that these watches were capable of discovering the currents in the ocean, as well as the longitudes; a thing, that was never yet done, and thought impossible to be done.

Mr. HOOKE remarked, that, in his opinion, no certainty could be had from these watches for the longitudes, because, 1. they never hung perpendicular, and consequently the cheeks were false. 2. All kind of motions upward and downward, (though it should be granted, that the watches hung in an exact perpendicular posture) would alter the vibrations of them. 3. Any lateral motion would produce yet a greater alteration.

The president observed, that these difficulties had been considered, and the matter put to experiment; which was to clear all.

In the mean time it was ordered, that the watches being brought ashore, some experiments should be made with them, by contriving up and down motions, and lateral ones, to see, what alterations they would cause in them.

Mr. HOOKE declared, that he intended to put his secret concerning the longitude into the hands of the president, to be disposed of as his lordship should think fit.

Mr. PEPYS was desired to bespeak a man, at Deptford, for diving.

The president, the earl of Northampton, Mr. BOYLE, Sir ROBERT MORAY, Sir WILLIAM PETTY, Mr. HENSHAW, and Mr. HOOKE, were appointed a committee, to consider of the improvement of artillery.

Sir ROBERT MORAY was desired to return the thanks of the society to Col. LEGGE*, for having obtained of the King a gun for the society to make experiments with.

Mr. HOOKE was ordered to draw up a series of experiments for the improving of artillery.

He mentioned, that he had discovered valves in the pores of wood, and seen them cross the pores; which he was desired to shew the society.

There was read a letter from Signior CASSINI of Bologna, dated at Rome Feb. 14, 1663; N. S. and sent from Paris by Monsieur AUZOUT to Mr. OLDENBURG, containing his hypothesis of the motion of the late comet, about the Great Dog. Which letter was ordered to be preserved.

Mr. OLDENBURG made a motion in the name of some member of the society, that when any fellow should have a philosophical notion or invention, not yet made out, and desire, that the same sealed up in a box might be deposited with one of the secretaries, till it could be perfected, and so brought to light, this might be allowed for the better securing inventions to their authors.

* Col. WILLIAM LEGGE, of the bed chamber to King CHARLES II. lieutenant and treasurer of the ordnance. He died Oct. 13, 1670, in the

83d year of his age.

Letter-Book, vol. i. p. 243. & seq. See Philof. Transact. n^o 2, April 1665. p. 17. 18.

This

This motion was assented to, but with the following addition, that such persons as should desire this should be put in mind, that they would endeavour to improve and finish their notions and inventions, and after about a year's interval produce them to the society.

Dr. GODDARD and Mr. HOOKE were desired to consider of the barometrical observations made through the last year, and bring in an account thereof; and the former to be curator of making diffusions of bodies.

March 22, Dr. GILBERT SHELTON, archbishop of Canterbury, was elected *ne-nine contradicente*.

DANIEL COXE, esq; was elected and admitted.

Dr. JOHN DOLBEN, dean of Westminster, was proposed candidate.

There were two experiments made for the finding out a way to breath under water, useful for divers. The first was made by putting a bird into the rarefying engine, and with it a glass-bottle with distilled vinegar and pounded oyster-shells, which, whilst the vinegar is dissolving them, affords a steam, which is supposed to be a kind of new air fit for respiration. The bottle was also close stoppt with a cork, so ordered, that by putting the stop-cock placed on the top of the receiver, the cork might by turning it be pulled out, without admitting an ingress of the external air into the receiver at all. Then the receiver being accurately cemented to the engine, the air was pumped out; whereupon the bird grew sick, and when he was thought near dying, the bottle was unstopped, that the steams and supposed air, that had been shut up in it during the operation, might have liberty to expand themselves in the receiver, for the refreshing and recovering of the animal. But here it succeeded not, so that though the bird was taken out of the receiver, and exposed to the fresh air, yet it recovered not.

The other experiment was made with a kitling, after the same manner as the former, except that instead of distilled vinegar was employed aquafortis; the success of which was, that the air being drawn out till the animal had done struggling, and was upon the point of expiring, and the bottle being unstopped to emit the steams and supposed air into the receiver, the kitling soon began to recover. Whereupon it had fresh air given it, which was again exhausted, to see, whether it would revive of itself without the help of any nitrous exhalation; but after this exhaustion, the animal appeared dying; upon which, it was after a little while taken out into the open air, where it revived again.

It was moved, that a cat should be put into the receiver, and that it should be observed how long she would continue alive, the air being pretty well exhausted; and that then another cat should be put in, and as many exsuctions having been made as with the former, the nitrous air generated in the bottle should be let out, in order to see whether the animal would recover thereby.

It was also moved, that a standard might be used, to know what quantity of air was generated.

The glafs phial with the swelled bladder, tried at the last meeting, and shut up till this, was produced, and the bladder found evidently shrunk. It was ordered to be tried at the next meeting with a glafs phial whelmed under water, in order to collect thereby all the bubbles of the air generated by the corrosion.

It being inquired, how it was known, that what was supposed to be air, produced by the dissolving of powdered oyster-shells by spirit of nitre, or distilled vinegar, or aquafortis, was true air; and answer being made by the president, that a body rarefied by heat, and condensed by cold, was air; the bladder was put to the fire, where it expanded again as much as before, and being removed from thence, grew somewhat flaccid again.

It being moved, that it might be tried, whether the steams produced by the operation of distilled vinegar upon the powder of oyster-shells were convenient for respiration; the trial was made, and the bottle, wherein that dissolution was performed, carried about to the members for every one to smell to it; and it was found by most of them inconvenient, as it was undiluted.

It being moved by Mr. HOOKE, that the air-boxes contrived for diving might be tried by the person bespoken by Mr. PEPYS for that purpose; it was ordered, that this diver should be sent to Mr. HOOKE, to be instructed by him concerning the use of the said boxes under water.

It was likewise ordered, that Mr. HOOKE should procure glasses fit to see with under water, as far as the thickness or turbidness of the water would permit.

Mr. OLDENBURG having read an extract of a letter of Monsieur AUZOUT dated at Paris 13 October, 1664, N. S. * acknowledging the excellency of CAMPANI's glasses above the Parisian; Sir PAUL NEILE moved, that certain inquiries might be made concerning them, and their charge, apertures, &c. Whereupon he was desired to draw up such queries, as he should think proper, for the better examining of the said glasses.

Mr. HOOKE offered to consider of experiments relating to respiration for the next meeting.

It was moved, that the experiments of refraction, and the descent of falling bodies, might be prosecuted; which was ordered to be done.

Mr. PEPYS was desired to procure the journals of those masters of ships, who had been with Major HOLMES in Guinea, and differed from him in the relation concerning the pendulum watches.

* Supplement to the Letter-Books, vol. i. p. 1.

1665, March 29, at the meeting of the COUNCIL were present,

The lord viscount Brouncker, preside ^t	Mr. COLWALL
The lord bishop of Exeter	Dr. CROWE
Dr. GODDARD	Dr. BALLE
Mr. HENSHAW	Mr. OLDENBURG.
Mr. PALMER	

It was ordered, that the president be desired to license the second tract of the *Philosophical Transactions*, written in four sheets of paper in folio.

At the meeting of the SOCIETY on the same day,

Dr. RICHARD STERNE, lord archbishop of York, Dr. HUMPHREY HENCHMAN, lord bishop of London, and Dr. JOHN DOLBEN, dean of Westminster, were elected.

There was read a letter written to Mr. BOYLE by Mr. DAVID THOMAS, concerning some farther particulars relating to the monstrous calf formerly mentioned, and rectifying some mistake in the preceding information concerning the stoniness of the breast of the calf. Whereupon it was ordered, that this account should be compared with the former, and the error corrected.

An experiment was made for the generating of air by putting aquafortis and the powder of oyster-shells into a small glass-phial under water, and whelming a large glass filled with water over it, to receive the steam to be generated by the corrosion. The success of which was, that the whelmed glass was filled about a quarter full with an aerial substance. It was ordered to be set by till the next meeting.

It was moved, that a way might be thought upon of producing air, that might be wholesome to inspire.

There was tried the refraction of water covered with turpentine; and the refraction of water alone being first examined by itself, and found to be $41^{\circ} 40'$, that with oil of turpentine being tried afterwards, was found to be $41^{\circ} 45'$.

It was moved by Dr. PELL, that the refraction of turpentine, after it had been upon the water, might be tried, in order to see, whether it differs from that, which was never joined with the water.

Col. BLOUNT brought in two models of chariots, one with two, the other with four wheels, of which he had tried the easiness of moving them by bullets upon different grounds; the particulars of which he gave in writing. His paper was ordered to be kept, and the operator was directed to make some models of chariots for trials with them.

Mr. HOOKE was desired to take notice of the pole of Prince RUPERT's hunting chariot.

Mr. HAAK was desired to get a draught and description of the great waggons used in the highways between Lubeck and Hamburg, carrying sixteen persons, with nine horses, three a breast; which he promised to do.

Col. BLOUNT produced a little red spider no bigger than a pin's head, commonly called a *Taint*, which, it was said, would kill a cow or ox by swelling them extremely, if it be taken down into the belly. He added, that an ox or cow, swelled by green clover upon hasty feeding on it, finds a remedy against that swelling by driving the beast three or four miles very hard, which expells the wind. Others use a knife, which they thrust into the flank, and so let out the wind.

Mr. HENSHAW affirmed, that thrusting a knife into the belly, and so letting out the wind, would save the beast.

Dr CHARLTON mentioned, that it was not probable, that the little spider should be the cause of the death of oxen and cows, since there are thousands of them in meadows, which would destroy innumerable cattle.

It was ordered, that some of these *Taints* should be procured by the operator, to try, whether they would kill a dog or cat.

Dr CHARLTON having been called to account for his taking home with him, contrary to the society's order, the little box with Macassar poison brought in by Capt. GRAUNT; he alledged, that he had done so, fearing it might be lost, it being found standing in the window, when all the company was gone out of the room; and he added, that he had opened and tried it before Mr. WYLDE. It was ordered, that nothing belonging to the society should be taken away without their leave.

April 5, by reason of the general fast kept this day, the meeting of the society was put off till the 12th of this month.

April 12, Mr. BOYLE's book intitled, *New Experiments and Observations touching Cold; or an Experimental History of Cold begun**, was presented to the society.

He proposed several experiments to be made, proper for this season of the year, viz. to try the grafting of pears upon *spina cervina*, the only purgative vegetable known in England, to see, whether the fruit would have that purging quality or not. 2. To try the sensitive plant in an exhausted receiver, to see, whether the exclusion of the air from it would be hurtful to that plant. 3. To try, whether the eggs of silk-worms and snails would be hatched; as also whether seeds would germinate and thrive, all in an exhausted receiver.

* Printed at London 1665, in 8vo.

Concerning the first of these experiments, it was said, that the time of grafting was past. Upon which, Mr. BOYLE moved, that it might be tried in the season of inoculation. Concerning the second and third, it was moved, that Mr. HOWARD might be desired to furnish the society with some seeds of an hasty growth, such as orpin, lettuce, and garden-cress, &c. which Mr. HOWARD accordingly promised. And as for that part of the third experiment, which related to the eggs of silk-worms and snails, the operator was ordered to get some of both, if possible.

Col. BLOUNT affirmed, that by covering a vine with a glass, he starved the vine; but that doing the same at another time with a glass having a vent hole in it, it hastened the growth thereof. He added, that plants, from which air is excluded, will come up yellow and very faintly; but the air being admitted to them, they may then grow better than they do by being covered; for hot-beds, if they be kept from air and moisture, grow faint and weak likewise.

Dr. GODDARD observed, that plants live as much upon the air as the earth; and that the branches of them are rooted in the air, as their roots are in the earth.

Dr. PELL moved, that the roots of some plants might be turned upwards, washing away the earth, to see whether they would shoot out in that posture; he judging it probable, that the tops of plants would turn into roots, as is seen in layers.

Sir ROBERT MORAY moved, that trials might be made with onions; first, by what degrees they decrease in weight, by growing and shooting out in the air without earth? Whereupon Dr. GODDARD mentioned, that he had found a squill decrease in weight for a quarter of a year, every fortnight eight or ten grains, the blades still shooting out longer and longer: Secondly, Whether onions and other bulbous roots will shoot in an exhausted receiver?

Mr. HOOKE affirmed, that a rosemary branch, cut from the root, will live by sprinkling common water upon it.

Col. BLOUNT suggested, that the sprinkling of the branches of harder vegetables would keep them alive; but not, if they were tender ones.

Dr. WILKINS moved, that a committee might be appointed to draw up a list of experiments about vegetation, as planting, grafting, &c. to be distributed for making experiments.

It was ordered, that Mr. HOWARD, Mr. EVELYN, Dr. WILKINS, and Col. BLOUNT constitute that committee.

Mr. DANIEL COXE was desired to produce his inquiries touching vegetation at the next meeting.

Col.

Col. BLOUNT remarked, that having kept a vine from moisture and air by leading it into a room of his house; he had found the grapes thereof ripe a fortnight sooner than those without.

Mr. HOOKE being called upon to give an account of one of the experiments at the last meeting relating to the air generated by aquafortis and the powder of oyster-shells, reported, that the greatest part of it was returned into liquor.

He was ordered to make at the next meeting the experiment of generating air with bottled ale, supposed to be wholesome to breath in, which the air hitherto generated by aquafortis and distilled vinegar was not.

It was moved, that the air produced by aquafortis and distilled vinegar might be given a dog to breath in, to see the effects thereof.

The operator was appointed to try again the feeding of spiders upon one another, by shutting two or more of them up in a close glass. As also to put a house-spider among a good number of ants, and to see, whether it would be torn and eaten by them; Dr. WILKINS having related, that such a house-spider being put with a multitude of ants upon a barrel-head, the ants first ran away from the spider, but then returned, and tore it in pieces.

Col. BLOUNT produced another model of an easy coach with four springs, capable of holding six persons; and he acquainted the society, that he had made farther trials of draughts with weights, delivering an account thereof in writing, which however he desired might not be looked upon as exact, because his models were not made accurate.

Mr. HOOKE was ordered to prosecute the model of his chariot with four springs and four wheels, tending to the ease of the rider.

It was likewise ordered, that the president, Sir ROBERT MORAY, Sir WILLIAM PETTY, Dr. WILKINS, Col. BLOUNT, and Mr. HOOKE should be desired to suggest experiments for improving chariots, and to bring them in to the mechanical committee, which was to meet on the Friday sevensnight following, April 21, at the president's house.

Sir ROBERT MORAY was desired to bring in the queries upon the new optic glasses of CAMPANI; which he promised to do at the next meeting.

Mr. HOWARD produced an account of the new comet, sent to him by his brother from Vienna; which was delivered to Mr. HOOKE, to compare it with other observations.

Dr. CLARKE was desired to finish his experiments of injection into the veins, and to publish them; and in order to the speedier dispatch thereof, to draw up a catalogue of such farther experiments, as he should think proper to be made, which
should

should be recommended to several persons of the society for trial, by way of assistance to him.

Mr. BOYLE suggested an experiment to discover, whether an animal in an exhausted receiver dies for want of air, or because of the compression of the lungs; which he said might be done by making a perforation in the thorax, between two ribs; whereupon if the animal should die as suddenly as others, it was manifest that it was for want of air: If not, it was because of the compression of the lungs, the external air being taken off.

April 19, Sir RICHARD CORBET, knt. was proposed candidate by Mr. HOSKINS.

Sir ROBERT MORAY presented the society from the King with a phial of Florentine poison, sent for by his Majesty from Florence, on purpose to have those experiments related of the efficacy thereof, tried by the society. It was ordered, that most humble thanks should be returned to his Majesty by the president and Sir ROBERT MORAY, in the name of the society, for this honour and favour; and that experiments should be immediately made with the said poison.

Accordingly a thread was dipped into it, and drawn with a needle through the skin of the neck of a pullet, which within two or three minutes was thereby so stupefied, that it fell down, and remained in that condition for about half an hour; but then began to stir again, recovering at last perfectly before the society rose.

It was also tried in the same manner upon a dog; whom it made to strain and vomit very much; but that past also, and the dog recovered.

Then it was tried upon a kitling by pricking it in the palate of its mouth with a needle dipt in the poison; which had no other effect but making the animal somewhat drowsy, and to flabber at the mouth.

Lastly, it was tried upon another pullet, by running a needle dipt in the poison into the great muscle of the thigh, avoiding the great tendon; but this had no effect at all upon the fowl.

It was ordered, that at the next meeting these experiments should be profecuted, and a larger quantity be given to a dog at the mouth; and that a larger wound should be made in some animal to receive a greater quantity of the poison.

The phial was sealed up, and delivered to the custody of Dr. GODDARD.

Mr. OLDENBURG presented the society with Monsieur AUZOUT's printed Ephemerides of the second comet, the motion of which the author pretended to have predicted, after he had made only three or four observations.

Dr. CROUNE presented from Sir ANDREW KING a paper with a scheme of the first comet, drawn by a Spanish jesuit at Madrid; which was delivered to Mr.
Hooke

HOOKE to compare it with the other observations; who was also appointed to take a copy of Dr. WREN's scheme of this comet, and to return the original to the Doctor for farther consideration.

The experiment of generating air with bottled ale, corked and tied fast about with an ox-bladder, was tried; but it yielded no air.

Sir PAUL NEILE produced a certain gum, brought from Guinea, thought to be like gum copal or gum anime; of which, he said, a great quantity might be had, if upon trial, it should be found worth the procuring. Mr. FOYLE was desired to take this piece with him, and to give the society an account of the success; which he promised to do.

Mr. HOSKYNs produced a parcel of thread, which he said was made in the East-Indies of a certain grass, and fit to make ropes of.

The consideration of the improvement of chariots was referred to the mechanical committee.

Mr. DANIEL COXE's inquiries concerning vegetables were read, and ordered to be registered, and the consideration thereof referred to the georgical committee. They were as follow *.

" It is impossible to compose an exact history of vegetation, till we understand
 " the nature of the ground, as the matrix, wherein all plants are conceived, and
 " whence they derive their nourishment. This hath so considerable an influence on
 " vegetables, that we attribute the difference in figure, colour and other properties,
 " principally to the variety of the mould; for we find, that every soil hath
 " a property of producing some peculiar plants, which will, either not grow at all,
 " or not so well, or, at least, degenerate from their former state, in any other.
 " Thus kitchen-herbs require a fat mould; others, and most trees, especially forest,
 " a barren; or at least one not too rich; some a dry; as marjoram, thyme and
 " crocus; most flowers require a middle soil, neither too rich nor too barren;
 " others a moist, as alder, willow, and all plants that naturally grow in or near
 " rivers, marshes, or the sea. There is an infinite variety of moulds, both for
 " colour, moisture, driness, and other qualities. Black land is generally accounted
 " the best, especially for a garden; and any mould to be so much the better, by
 " how much the nearer it approaches to that colour; and on the contrary: yet
 " there is scarce any ground, how bad soever, but may be enabled by suitable
 " composts, warmth, moisture, and other meet helps, to answer our expectation.

" 1. For composts, these rules are generally observed; never to add compost
 " to ground, wherein that quality predominates, which doth also predominate in
 " the land.

* Register, Vol. iii. p. 79.

" 2. That

" 2. That any thing, which hath active parts, if it be not of the nature of the ground, will raise improvement. Any parts of animals are good compost; their skins, hair, horns and hoofs make the richest, next their blood and flesh; and lastly their urine and dung. So also are all substances, that contain any fatness or saltness; as hog-wash, lees of wine, beer, perry or cyder, sea-ooze, scouring of ditches, all sorts of sea-weeds, and most land-plants rotted; foot, ashes of all kinds, linen and woollen rags, nitre and common salt in a moderate quantity; for any compost too plentifully bestowed hinders the growth of vegetables.

" Divers kinds of earth are good compost for others of a different nature, marle, chalk, lime, loamy earths, &c. Some dry grounds are meliorated by seasonable irrigations.

" Being skilled to improve grounds to the best advantage, we come to enquire; how many ways plants may be propagated and altered, how the operations are performed, and what products ensue.

" And it will be, first, worthy our enquiry, to examine, whether there are not vegetables *sponie nata*; for a new generation of plants do sometimes suddenly and unexpectedly spring up in places, none of the same species growing near; as is affirmed by ACOSTA of lemons and citrons, which sprang up without previous planting or sowing in America: and by others the same of firs, pines, and olives. An exotic plant being set in the physick-garden in Oxford, the next year many of the same plants were found in a wood, some miles distant from the city: And mould taken a great depth from under the surface of the earth, placed in pots, and set on the top of an high tower, produced several plants, yet none but such, as that country afforded.

" 1. Query, Whether these seeds might not be brought by the wind, and there deposited, most small seeds being sledged with little downy wings; or whether the birds might not void them with their excrements; the vegetative virtue being rather exalted than destroyed by that light digestion?

" 2. Whether plants are propagated by any other, than the five noted ways, of seed, off-sets, slips, layers and incisions? Whether by tear, or flower? as some even of the antients do confidently aver. And whether there be any instance of propagating by leaf, besides that of the Indian fig? *Lens palustris*, with several other sea-plants, are supposed to be propagated without seed or root? We know not of any seeds, that fallows and mushrooms have, and yet 'tis reported, that if the water, wherein mushrooms have been steeped, be cast on an hot bed, they will soon spring up in the form of young mushrooms; and the same effect will follow from bits thereof strewed on an hot bed.

" 3. Whether any plants arise from the fixed salt of any plant sown?

" 4. Whether the dust on the backs of hart's-tongue, maiden-hair, ferns, and polypody, be their seeds? They deserve to be examined by the microscope.

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" Nature's

" Nature's usual way of propagating vegetables is by seed. And when we would
 " propagate plants this way, the most natural time of sowing seems to be that,
 " which nature follows, when the seeds, of their own accord, fall into the ground.
 " Only plants, which cannot bear the cold, are to be sowed in the spring.

" 5. Whence is it, that vegetables later sown, often overtake the former; as
 " pease and beans?

" 6. Why some plants are hardly propagated by seeds; as garlick, dragons,
 " hops; and onions, contrary to the guise of all bulbs, never emit any off-fets, but
 " are propagated only by seeds?

" 7. Whether double flowers give not little and invalid seed? and whether being
 " sown, they do not mostly afford single flowers? For it seems probable, that the
 " more is spent on the flower, the less is left for the seed. And also, whether
 " the seeds of single flowers of the same species will not afford much seed, and
 " that good?

" 8. Why divers seeds of the same kind, being set in the same mould, and
 " distance, some outshoot the rest: and whether the greater or less send forth largest
 " plants, and of speediest growth; as it is evident the fairest buds do?

" 9. Whether the bottom of the cod brings forth the largest seed? If so, whe-
 " ther it afford the fairest flower?

" 10. Whether it is from the seeds of the same carnations, and so of divers
 " other flowers, so great a variety proceeds; few or none of them keeping colour
 " with the mother plant?

" 11. Whether there be a certain way to know what plants will yield variety
 " of colours? which double? which single? or whether you can know from the
 " leaf or any other indication, as the broad leaved anemonies are supposed to
 " yield a greater variety of double flowers, than the narrow?

" 12. Whether that be true, which is related of the *marveil of the world*;
 " that if you would have variable flowers, choose such as are variable, whilst they
 " blow; for if the flowers be of a single colour, the seed will bring the same?

" Most seeds have within their coats a neb answering to a root, which is joined
 " to leaves more or less in number, amidst which leaves there is a germen oppo-
 " site to the initial root. Most plants have two leaves actually joined to the neb;
 " which are commonly very unlike the proper leaves of the plant, some have 2,
 " others 3, 4, 5 or 6. Those leaves are visible to the bare eye in common beans;
 " kidney-beans, pease, sycamore-keys, &c. and they seem to differ but in growth
 " and bigness from the true leaves of the plant.

" 13. Whether they may not be discovered in lesser seeds by the microscope?

2.

" 14. Whe-

“ 14. Whether if the feed be cut in half, between the neb and germen, one half, neither, or both will grow? 'Tis reported by credible persons, that if the germen be whole, though the other part were gnawn by vermin, cut off, &c. yet nevertheless the feed thrives exceeding well?

“ 15. Whether the neb in germination strikes downwards, and causes the root; the germen upward, and produceth the stalk and leaves; or whether both root and stalk proceed from one and the same point, thence taking different courses; as seems evident in walnuts, peaches, melons, and other feed?

“ 16. Whether the whiteness of most roots arises from their being secluded from the air, as the leaves of plants kept in a close place grow pale, and those leaves of cabbage and lettuce, that are exposed to the open air, are green; those, that are covered, white?

“ 17. Whether so many off-sets will be emitted by a bulbous root, as wounds were made in it before by a pen-knife; or your nail, as FERRARIUS reports.

“ 18. Whether plants can be raised in water, and when grown up, whether nourished thereby, especially plants of contrary qualities, as hot, cold, moist, dry, fresh, salt, of healing or vesicatory nature: and what substances these plants afford, exposed to chemical analysis?

“ 19. Whether roots are driest in winter or summer?

“ 20. Whether in grafting, this rule be constantly to be observed, to place the graft so, that the space under the bark of the graft must answer to the space under the bark of the stock; and whether that space between the bark and wood is the great channel for the conveyance and keeping of the sap, and whether it runs up the fibres of the bark, or trunk itself?

“ 21. Whether in grafting, the surest way to obtain fruit be, to keep as clear the species as can be; and what exceptions may be made from the general rule of grafting, inoculating, abscission, conjunction, by trebiration, that the cyons be of the like nature with the stock?

“ 22. Why a plum will not bear fruit being grafted on a cherry, a pear, or apple, when as they prosper on each other for several years?

“ 23. Why medlars, but more especially pears, thrive exceedingly well, and are fruitful, being grafted on a white thorn; quinces on the pear, and *vice versa*; apricots with plums that are full of sap; roses on briars, currants on gooseberries? And why a cherry grafted in the bud on a plum-tree will bear cherries, but not contrariwise?

“ 24. Whether it is absolutely necessary, that cyons should be gathered before trees shoot their buds, since 'tis no matter though the stock be budded?

- " 25. Whether a long cyon make a short and spreading tree, and a short a tall one?
- " 26. What graffs and stocks afford greatest store of fruit; and what most speedily?
- " 27. Whether it be necessary to take the graffs from a tree, that is a good bearer?
- " 28. Whether if taken from a tree, that never did bear flowers or fruit, the graft will give fruit?
- " 29. Whether the rule holds univerfally, that grafting fucceeds beft on a drier ftock; and whether the graft fhould be of 1, 2 or 3 years growth?
- " 30. How to difcern good graffs; whether we fhould take the graffs from the top or middle of the tree, thofe fhoots, that are obverted to the rifing meridian, or feting fun; and alfo what fhould be the nature, bignefs and age of the ftock?
- " 31. Wherefore mulberries, walnuts, and cherries cannot be propagated by graiting, when-as they may eafily by inoculation?
- " 32. If two twigs of feveral trees were flatted on the fides and bound together, whether will they unite in one ftock? If fo, perhaps the fame branch would produce different fruits.
- " 33. If a fhoot be taken from a tree, and another of a diverfe branch of the fame tree be grafted in its place, will not the fruit differ from all others on the fame tree?
- " 34. Whether an apple grafted on the woody part of a cabbage-ftalk will thrive? If fo, whether will the fruit follow the nature of the ftock or graft?
- " 35. If you graft fharp fruit upon a fweet ftock, early or late, whether will the fruit for nature and time follow the nature of the ftock or graffs?
- " 36. Wherefore pines, firs and refinous trees will admit of no graffs?
- " 37. Whether fedums, tithymals, orpines, aloes, onions, tulips and other bulbous roots, which, hung up in the air, fhoot out green leaves, leffen in weight thereby?
- " 38. Wherefore change of feeds profitable for all grains, and garden plants?
- " 39. Whether do trees and fhubs bear on fprouts emitted the fame fpring, or on the fhoots of the antecedent fpring, or both?

" 40. Where-

" 40. Wherefore are trees troubled with cancer, hidebound, and some flower so full, that they burst the calix, or case; and how those diseases may be cured?

" 41. The lowest fruit in wall-trees is soonest ripe and largest: whether would it not be so in orchard-trees, if the sun had as free access to the lower boughs, as it hath to the middle and upper?

" 42. Whence arises that great variety in apples, pears, &c. that some are ripe early, some have excellent taste, some are beautiful, others large, some great bearers, others good bakers, some long lasters, others best to make perry, cyder, &c.?

" 43. Whether that be true, which is related of Canada in America, an intolerable cold country, yet the woods afford a grape without culture, whereof is made good wine?

" 44. Whether lands are meliorated by being exposed to the sun and air, and therefore grounds are said to receive much benefit by often ploughing, the sun and dew engendering, as it is thought, a nitrous fatness, which is the cause of fertility; on the contrary, the virtue of dung is daily exhausted by being exposed to sun and air.

" 45. Whether the tree orchis will thrive better on a dry chalky bank, than in any garden, though it be never so carefully looked after, and the mould never so rich?

" 46. Whether one grain of wheat or any other corn, by a peculiar way of fermentation, maceration, composts, or otherways, may be enabled to bring forth above an hundred ears from the same root, as is credibly reported?

" 47. Whether exotic plants, that at first difficultly thrive, yet being habited to the country, and to shed their seed, are naturalized?

" 48. Whether seed, brought from barren stony grounds, and sown on rich, afford so great an improvement as is affirmed?

" The water, wherein cabbages and other garden fruit, raised in a ground forced with dung, hath been boiled, will stink sooner than that, wherein the same plants were boiled, which grew in a barren ground; consequently,

" 49. Whether dung, as it causeth increase in quantity, doth not embase vegetables, its ill taste being easily discernable, as in musk-melons raised on hot beds?

" 50. Whether great variety of fruit be obtained by sowing kernels; it being observed, that the kernels of the same tree bear fruit differing from each other, in colour, taste and form? From those trees, being fruitful, cyons enough might be taken to furnish a whole country with fruits of the same kind.

“ 51. Whether was not that great variety of fruit, which we have, formerly obtained by this means; at first all fruits being wild, and it is very improbable, that they should afford fruits of such variety and excellency?

“ 52. Why doth the earth seldom produce some plants but in producing others; as some plants are rarely or never found, unless in ploughed fields, either under corn, tillage or fallow?

“ 53. Why do some plants, as it were, destroy the vegetative nature of the soil where they grow, as to many plants, as wood, hemp, &c. and on the contrary, some fit it for others?

“ 54. Whether the peach was poisonous in Persia; and whether the hemlock of the antients, wherewith they poisoned malefactors, was the same with that, which is so often eaten innoxiously in Europe?

“ We find by frequent experience, that many of our herbs have not the same properties and virtues, that the antients ascribed to them:

“ 55. Whether doth not this proceed from the variety of the soils, their different situations and positions, in respect of the sun, moon, and perhaps other planets? To what, besides this, can we refer that infinite variety of colours, tastes, odours, and other properties in vines, and other vegetables? As the inhabitants of the Torrid Zone acquire, not only thereby, black skin and hair, but also a peculiar crasis of body, and complexion of mind very different from theirs, that inhabit more temperate and cold regions.

“ 56. What respect are we to have in ordinary vegetables to the phases of the moon; and whether are trees more full of moisture in the increase of the moon?

“ 57. Whether the perpetual summer in the Torrid Zone be to be ascribed to the abundance of salt, or to equality of days: the former seems to contribute much; and seas between the tropics are thrice as salt as in our northern parts; so that many salt vapours are elevated, and many left in earth by percolation?

“ 58. Whether that be credible, which is related of Tercera, one of the Azores, an isle deformed with craggy hard rocks, which are nevertheless incredibly fruitful of vines, whose roots descend a considerable depth into the rock?

“ 59. Whether sheep in Spain, being fed and fattened with thyme, savory and rosemary, have thereupon finer wool, flesh of a fragrant smell, and sweeter taste than ordinary?

“ 60. Whether the island Ferro, one of the Canaries, hath a tree, whose leaves are perpetually green, and from whence water distils so plentifully, that it supplies the whole island?

“ 61. Whe-

“ 61. Whether any trees bear their fruit on their bark, which PRISO, and the author of the history of the Antilles or Caribbee-Islands, affirm?

“ 62. Whether any trees, whose flowers, when the sun shines, are closed, expand in the night, and shut again at sun-rising; and what may cause the contraction of the branches of the sensitive plant on touching?

“ 63. Whether what ACOSTA relates of the tree cocos may be credited, viz. that the young nuts contained a potable juice like milk, which being ripe, was as hard as the pulp of a chestnut; and he also reports, that this tree did put out every month a new shoot, each of which produced fruit, so that the tree did bear 12 times in the year?

“ 64. By what means may fairness and magnitude in fruit, and multiplicity in the leaves of flowers, be promoted; and whether any plants bear single and double flowers on the same root?

“ 65. Whether white flowers may not be changed into red, yellow, blue, &c. by frequent irrigation with colorate liquors not corrosive: as infusion of brasil, crocus, &c.?

“ 66. Wherefore flowers in their perfection are neither black nor green?

“ 67. Whence it is, that trees decayed with inward hollowness do often bear as full burthens of fruit, as the soundest; and that the fruit is more delicate, than usually any of the same kind from a more perfect and intire stock?

“ 68. Whether do all trees in their increment proceed with more or less velocity, as they are of a more compact or lax contexture?

“ 69. Whether white apples grafted on an elm will not change to a red colour; and whether the graft doth not yield somewhat to the stock?

“ 70. Whether will forest-trees thrive best in a fertile or barren ground? It is strange, that pines, firs, &c. thrive best on hard rocks, and will not grow kindly in an over rich, fat soil; and yet they require much nourishment, and that of a sulphureous or oily nature?

“ 71. Whether trees can live without their barks, whether the cork-tree be relieved by disbarking, and whether the cork be the inward bark; for it is not that outward bark, that is vital, most trees being able to subsist without it; as cherries, vines, lime-trees?

“ 72. Whence that timber-trees in a copice grow better than in the open field; and that mountain-timber is of a closer, finer grain, more tough and durable, than that which grows in most shady places?

“ 73. Whe-

" 73. Whether the juice, that distills from the wounded birch in March, will
" in 12 or 14 days outweigh the tree itself, body and roots ?

" 74. Whether willows will thrive, which end soever of the truncheon be set
" in the ground ?

" 75. Why wood of the larch-tree is so hard to consume by fire ?

" 76. How far cold proves conducive to vegetation ; for snow is said to warm
" the ground ; and in Greenland, the grafs and other vegetables in the midst of
" the most bitter winter retain their lively verdure, so they be under snow ; and
" it is reported, that plants will never freeze, if covered with *alga marina* ?

" 77. Whether hot-beds be the best and most general help to accelerate germi-
" nation and maturation ? so that of the sun, reflected from solid bodies, collected
" by concave glasses, and projected on plants or fruits ; so, if planted on the back
" of a chimney, or translated into richer mould.

" 78. Whether cutting the tops of flowers, after they have done bearing, will
" make them come the same year ? or whether pulling off the buds, when newly
" knitted, removing the tree a little before it buddeth, girding the body of the
" tree about with a string, will retard germination ?"

April 26, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t

Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Sir JOHN LOWTHER
Sir WILLIAM PETTY
Mr. PALMER

Dr. WILKINS
Dr. GODDARD
Dr. CROUNE
Dr. BALLE
Mr. GRAUNT
Mr. OLDENBURG.

The papers of the third number of the *Philosophical Transactions* having been considered of, and the account therein given concerning the structure and advantages of Sir WILLIAM PETTY's double-bottomed ship ; it was resolved, that the publication should be deferred till the King had been made acquainted with the particulars relating to the said ship.

At the meeting of the SOCIETY on the same day,

Mr. HOWARD produced some observations on the second comet, as they were sent to him by his brother from Vienna ; which were recommended to the perusal of Mr. HOOKE.

Sir ROBERT MORAY moving, that some inquiries might be drawn up to be sent to Mr. HOWARD's brother concerning observables in Hungary and Turkey, whither

ther he was travelling, was desired to draw up such inquiries in conjunction with Mr. OLDENBURG.

The experiments with the Florentine poison were prosecuted. A drop of it in a quill was given at the mouth to a young dog, who presently fell into strong convulsions for about a quarter of an hour, with his eyes fixed, and then lifted up his head, looked about, and by little and little recovered.

The like quantity, as near as could be guessed, was given to a cat, who also fell immediately into the like convulsions, and within five or six minutes died.

There was likewise an incision of the bigness of about an half-penny made upon the neck of a pullet; and a drop of this poison put into the wound; upon which the pullet was soon stupefied, but within a little while after recovered.

Another pullet was pricked in the axillary vein, with a needle dipt in the same poison; which had no visible effect; but the same needle dipt again, and thrust into the muscle of the pullet, stupefied it. To the same pullet, when recovered, a drop was given at the mouth, which cast it into convulsions, yet without killing it.

The cat killed by the poison being opened, and the brain and stomach viewed, nothing appeared, that was extraordinary in either of those parts.

Dr. CROUNE was desired to bring in at the next meeting some oil of tobacco distilled in a retort, to try what effect that would have upon animals.

Mr. BOYLE suggested, that the oil of Florence performed its effect, either by the union of the subtle and spirituous parts of tobacco, or by a peculiar preparation of the same; and in order to know upon which of these two accounts the effect was produced, he moved, that some tobacco might be well distilled in an alembic with water.

Sir ROBERT MORAY affirmed, that he had known a man, who could take two or three pipes of tobacco into his stomach before he let out any smoke; and then let it out afterwards all together.

This was seconded by Mr. EVELYN, who remarked, that he had seen a person, who, after taking tobacco, would discourse a while before he let out the smoke.

Col. BLOUNT produced another model of a chariot with four springs, esteemed by him very easy both to the rider and horse, and at the same time cheap. It was ordered, that the committee formerly appointed, viz. the president, Sir ROBERT MORAY, Sir WILLIAM PETTY, Dr. WILKINS, Col. BLOUNT, and Mr. HOOKE should be desired to meet at Col. BLOUNT's house at Writtemarsh, about this matter, on the Monday following, and give an account of what they had done there at the next meeting of the society.

Dr. WILKINS moved, that a horse-hair, said to acquire an animal motion, after it had been put into a pool shined on by the sun, might be procured by Col. BLOUNT, and brought to the society to be viewed in a microscope.

Mr. OLDENBURG produced a Latin letter, written to him by Dr. PHILIPPUS JACOBUS SACHS A LEWENHEIM, an able physician at Breslaw in Silesia, dated there 12 January 1664^a, expressing his high esteem of the institution and design of the society, accompanied with a tract of his concerning the analogy between the motion of the blood in animals, and that of the ocean in the earth; and desiring some assistance to his book of cray-fish.

It was ordered, that Mr. OLDENBURG draw up an answer of thanks to Dr. SACHS, for his respect to the society^c.

Dr. PELL put the society in mind of the seasonableness of making experiments with May-dew; which was ordered to be considered of at the next meeting.

May 3, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t

Mr. HOWARD

Mr. AERSKINE

Sir ROBERT MORAY

Sir WILLIAM PETTY

Mr. PALMER

Mr. HENSHAW

Dr. GODDARD

Dr. BALLE

Mr. GRAUNT

Mr. OLDENBURG.

It was ordered, that the president be desired to license the third number of the *Philosophical Transactions*, deferring to another time the account of Sir WILLIAM PETTY's ship.

At the meeting of the SOCIETY on the same day,

RICHARD earl of Dorset was proposed candidate by the earl of Northampton, and immediately elected and admitted.

Sir RICHARD CORBET was likewise elected and admitted.

Sir THEODORE DE VAUX, knight, was proposed candidate by Dr. WILKINS.

Mr. DANIEL COXE read an account of the effects of tobacco-oil distilled in a retort, by one drop of which given at the mouth he had killed a lusty cat; which being opened, smelled strongly of the oil, and the blood of the heart more strongly than the rest. His paper was ordered to be registered^d.

^a Letter-Book, vol. i. p. 263.

vol. i. p. 272.

^c Mr. OLDENBURG's Latin Letter to him, is dated at London 30 May, 1665. Letter-Book,

^d Ibid. fol. 89.

One drop of the Florentine *oglio di tobacco* being again given to a dog, it proved stupefying and vomitive, as before.

The like effect was produced by one drop of Mr. COXE's tobacco-oil upon a dog.

One drop of the same oil given, at the mouth to a young cat cast her presently into convulsions, out of which she however recovered. Mr. COXE observed, that it was given in less quantity in this case, than before.

Dr. CROUNE produced a liquor prepared of tobacco, being the oil and spirit of it together; one drop of which being given at the mouth to a very little kitling, killed it in a few minutes.

He related, that he had heard from a credible person, that a certain woman troubled with the tooth-ach, and taking a drop of tobacco-oil, fell into very odd convulsive and hysterical fits, from which she was relieved by spirit of hartshorn.

He and Mr. DANIEL COXE were desired to prosecute this kind of experiments upon other animals, and to bring an account of the success to the society.

Mr. HOWARD brought in an account in writing of Macassar poison, called *Ippo* in the island of Celebes; which account he had received from one, who had lived four years there, and was now come to England. This account was ordered to be registered*, as follows:

"Ippo, so called in the Macassar and Malayan tongue, is the gum of a certain tree, shining, brittle, black, and every way like stone-pitch, growing in the island Celebes, in the South-seas, very far up in the country, and gathered by the savage-people living there, who are called by the Macassars, *Teragias*; they themselves being civilized Mahometans, called Macassars, from the place of the island so called; who having some correspondence with them, have the said poison brought by them; with which all the natives arm themselves in travel, having a long hollow trunk (by them called *Sampitan*) of a hard red wood like brass, fix or seven foot, very accurately bored, (like our trunks we use to shoot clay-pellets with) and at one end is fixed a large lance-blade of iron.

"Then they make a small arrow, a foot or ten inches long, very strait, and something bigger than a large wheaten straw: at one end they fix it into a round piece of white, light, soft wood, like cork, about the length of the little finger, just fit for the bore of the trunk, to pass clear by the force of one's breath, and to fill it so exactly, that the air may not pass by, but against it, to carry it with the more force.

"At the other end they fix it either in a small fish-tooth for that purpose, or make a blade of wood of the bigness of the point of a lancet, about three quarters

* Register, Vol. iii. p. 97.

“ of an inch long, and making a little notch in the end of the arrow, they strike it firm therein, the which is anointed with the poison, prepared and done in this manner.

“ The *Teragias*, when they gather this poisonous gum, always go to windward of the tree (as I have been told by them, no stranger having ever been in those parts of the country) and when they have gathered it, they put it into hollow bamboos or canes, stopping it up very close, and in that manner bring it to Macassar.

“ Of that which is good, none but the Kings and persons of quality have, which they dissolve and make up, upon the end of a stick, about half an inch thick; and then with plantain leaves and long strings, wrap it and bind it up, to keep it from the air; and they put it into a close warm place to preserve it. In which manner it keeps two or three years good, it being sometimes opened, clean wiped, and, as before, put up again.

“ And this caution had, that no live sea-crab be brought and burnt alive under the same roof, where it is kept, by reason, as I was credibly told by them, that thereby the poisonous quality thereof is destroyed, the experiment whereof I have not had the opportunity to try.

“ Divers great persons there did inform me, that they and their predecessors have endeavoured to find its antidote, to prevent its effects, after any one was pricked therewith, but cannot.

“ When they fit it for use, they take a piece of smooth turtle-shell, and a stick cut flat and smooth at the end; then they take green galangal-root, grate it, and with the addition of a little fair water, press the juice into a clean china-dish.

“ Then with a knife, scraping a little of the poison upon the turtle-shell, dip the end of the stick in the foresaid liquor, and therewith dissolve thereon the poison, to the consistence of a syrup; which so done, with the same stick anoint the above-said fish's-tooth, or wooden blade, it being fixed in the end of the arrow: And then lay them in the sun, upon cross-sticks, three foot high from the ground, until it is baked hard thereon; which will be in two hours time.

“ And then they are put up in hollow bamboos, close shut; and so prepared, they will retain their virtue a month's time. But after the poisonous quality will quite decay, and therefore the arrows, that are brought for England, having lost their poisonous quality, effect nothing.”

Mr. HOWARD was desired to shew to the person, from whom he had received this account, the Macassar poison, brought in for such by Capt. GRAUNT, to judge whether it be like the poison described by him.

Mr. PALMER presented the society with several American curiosities for their repository, viz. a *cervus volans*, a humming bird, several rattles of rattle-snakes, and the pizzle of a raccoon.

Mr. THOMAS COXE presented the society with an abortive human foetus, kept in spirit of wine well rectified.

Mr. HOOKE produced the model of a chariot with two wheels and short double springs, to be drawn with one horse; the chair of it being so fixed upon two springs, that the person sitting just over, or rather a little behind the axle-tree, was, when the experiment was made at Col. BLOUNT's house, carried with as much ease, as one could be in the French chariot, without at all burthening the horse.

He shewed two draughts of this model, having this circumstantial difference, that the one of these was contrived so, that the body sitting in a seat made for him behind the chair, and guiding the reins over the top of it, drives the horse: the other, by placing the chair clear behind the wheels, the place of entry being also behind, and the saddle on the horse's back, being to be borne up by the shafts, that the boy riding on it, and driving the horse, should be little or no burden to the horse.

Col. BLOUNT objected to these draughts, that the seat lay too near the ground: To which it was answered, that the bottom lying loose, it would without inconvenience be lifted up, in case it should hit against the ground.

The proposition for trying experiments with May-dew being renewed, the operator was ordered to procure a good quantity of it, to be gathered, either with flannels, oiled cloth, glass, earthen pans glazed, or sponges.

It was ordered likewise, that the experiments suggested by Mr. HENSHAW concerning May-dew, be tried; and that Dr. PELL take the paper concerning those experiments with him, in order to add such as should occur to him.

The following experiments were appointed for the next meeting,

1. Silk-worms eggs and seeds in an exhausted receiver.
2. Two cats in a receiver, one without supply of air, the other with it.
3. Mr. BOYLE's experiment, mentioned at the meeting of April 12, to discover whether an animal in an exhausted receiver dies for want of air, or from the compression of the lungs.
4. Experiments of poisoning animals by injecting tobacco-oil into their veins, and by anointing their shaved skins with it.

May 10. Sir THEODORE DE VAUX was elected.

EDWARD,

EDWARD, earl of Manchester, was proposed candidate by Sir ROBERT MORAY, and immediately elected.

Sir WILLIAM HAYWARD was proposed candidate by the earl of Northampton.

The experiment of perforating the thorax of a dog, and putting him into a receiver of the rarefying engine, was made with this success, that the dog, which was but a very young whelp, upon a few exsuctions grew sick, fell down, and probably would have died, if fresh air had not been re-admitted into the receiver, or the dog taken out.

The ground for making this experiment being taken notice of, viz. that it might be determined, whether an animal died in an exhausted receiver upon the account of want of air, or the compression of the lungs by the rarefied air, upon the removal of the external air; it was debated, whether there was any considerable quantity of air in the thorax; some pretending, that there was not, because the concave part of the thorax and the convex parts of the lungs lie close to one another: others alledging, that though there be that closeness between the thorax and the lungs, yet these and the other parts of the chest do not so adequately fill all the places thereof, but that there may be room for air and vapours.

Dr. WHISTLER upon this occasion remarked, that the Moors had a faculty of killing themselves with keeping in their breath.

Mr. BOYLE took notice, that he had tried, and found, that a large perforation being made in both sides of the thorax, the animal died immediately, though not with a small one.

It was ordered, that this experiment be shewed to the society at the next meeting.

The experiment of injecting oil of tobacco into the veins of a dog was deferred till the next meeting.

Mr. DANIEL COXE affirmed, that he had given to a dog at the mouth, without killing it, six times the quantity of what he had given to a cat. He promised to try other experiments with this oil, and with other liquors, supposed by him to have the same quality with the said oil; and to bring in an account thereof to the society.

Dr. PORE presented the society with several curiosities, which he had met with in his late travels, viz. a ball of hairy matter found upon the shore of the Tyrhene sea; some stones from mount Vesuvius, pumice-stones, *flos sulphuris*, and some mercury-ore found in Friuli, which last was ordered to be weighed in water before it was distilled.

† That part of the Mediterranean sea, which washes the southern parts of Italy.

The person, who had been several years at Macassar, being sent by Mr. HOWARD to the society, to look upon the poison, which was brought in by Mr. GRAUNT for that of Macassar, and to give his judgment, whether it were such, or not; affirmed, that it was not it, nor at all like it.

Mr. ROYLE desired, that endeavours might be used to get some of the right Macassar poison; and that it might be sent over in the same manner, as it is preserved upon the place; which was recommended to Dr. CROUNE.

Mr. EVELYN read a letter from Deal in Kent, dated May 6, concerning Sir WILLIAM PETTY's double-bottomed ship, viz. that the captain and several officers of the Greyhound frigate had affirmed, that they with several ships besides had borne her company to the land's end, the Greyhound being the best sailer of those ships, and reputed a very good sailer; but that the double-bottomed ship spared her all her small sail, and yet she out-sailed her so much, that they were obliged to clue up the lee-clue of the main-sail; and yet the Greyhound could hardly keep her company: That the trial was before the wind; but it was concluded, that she would do as much or more by a wind.

Mr. HOWARD, Dr. MERRET, and Mr. HOSKYNs, chairmen of the committee for agriculture and composing of the histories of nature and art, gave an account of what had been hitherto done in their respective committees^s; for which they received the thanks of the society, who recommended to them the care of making farther progress in their respective work.

Col. BLOUNT gave an account of the exceeding growth of carps in a short time; and was desired to make farther observations thereof, and to bring in an account, not only of the several dimensions, but weights, of the carps taken at several times.

Dr. WILKINS mentioned an account, which he had received out of America concerning the comet; which was ordered to be produced at the next meeting.

May 16, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t
Mr. HOWARD
Mr. AERSKINE
Sir ROBERT MORAY
Sir JOHN LOWTHER
Mr. PALMER

Mr. HENSHAW
Dr. WILKINS
Dr. BALLE
Mr. COLWALL
Mr. GRAUNT
Mr. OLDENBURG.

It was ordered, that the president, Sir ROBERT MORAY, Sir WILLIAM PETTY, and Dr. WILKINS be a committee for reviewing Mr. SPRAT's relation concerning the institution and design of the Royal Society.

^s Their inquiries concerning agriculture are printed in the *Philos. Transact.* n^o 5, p 92, July 1665.

May 17, Sir WILLIAM HAYWARD was elected, and MALACHY THRUSTON, M. D. was proposed candidate by Dr. WILKINS.

Three accounts were brought in of the late comets; one by Dr. WILKINS concerning the first, sent out of New England; the other two by Mr. AERSKINE, concerning the latter, written from Prague and Leige: All which were ordered to be delivered to Dr. WREN and Mr. HOOKE.

There was read a letter of Dr. WALLIS from Oxford, of May 8, 1665, concerning his performance in digesting Mr. HORROX's papers into one piece, together with his recommendations thereof to the press; which was referred to the consideration of the council.

The experiment of injecting the Florentine oil of tobacco into the veins of a dog's leg was made, but without any apparent effect upon him. It being suspected, that the injection was not rightly made as to the quantity of the poison injected, it was judged necessary, that the experiment be repeated at the next meeting.

It was suggested by Dr. WILKINS, that the experiment of injecting the blood of one dog into the vein of another might be made.

The lord BRERETON related, that he had been informed, that a horse tired in his journey to London, upon the giving him at the mouth a draught of sheep's or calf's blood, (his lordship not remembering which of the two it was) was so revived and strengthened, that he performed very well the rest of his journey.

Mr. THOMAS COXE gave an account, that he had killed a boar-cat with a drop of the oil of tobacco drawn by himself; and that having given the same quantity to a female cat, he had recovered her, when she was expiring, by the means of the oil of *asa fetida*. He was desired to try the recovering of a male cat with the like oil, and to bring in an account of all his trials in writing; which was also desired of Mr. DANIEL COXE about his experiments.

It being moved, that the experiments recommended the year preceding concerning the production of insects by putrefying dead flesh, the lungs, blood, &c. of animals, might be pursued; the lord viscount STAFFORD promised to make some trials of this kind by putting such matter into a receiver in a moist and warm place, exposed to the morning sun, the vessel being tied over with flannel, to secure the matter from being fly-blown, and brushing the flannel sometimes clean from the filth, which flies and other insects might cast upon it.

Mr. WILLUGHBY mentioned, that he was trying, whether mites will breed of eggs, as they will in wood, cheese, pease, &c.

Mr. BOYLE observed, that he had drawn a catalogue of experiments relating to spontaneous generation, to be made two ways: 1. in glasses hermetically sealed, having

having the ordinary air in them: 2. in glasses first exhausted, and then sealed up. He was desired to communicate his catalogue to the society, that by them he might be assisted in the prosecution of such experiments.

Mr. HENSHAW affirmed, that he had seen mites bred on the top both of claret and white wine in bottles (which he guessed had not been well drained) and vessels drawn low; the wine being full of flowers, which, when he looked upon by a microscope, he found stored with mites.

Sir ROBERT MORAY inquiring how worms should come to be generated in vinegar, it was suggested by Dr. GODDARD, that vinegar probably had some crude waterish matter in it; which turning into a slimy substance might breed those worms.

There was tried an experiment of making an hole on each side of the thorax of a dog, to see, whether he would live after it. The success was, that the dog remained alive the wounds being but small, and the animal by breathing making the skin to pass over the wounds, and thereby covering them.

This experiment was ordered to be made at the next meeting, by cutting a hole in the sternum of the dog on both sides.

It was ordered also, that on the Friday morning following, about nine, the variation of the needle should be observed in Whitehall garden, by the curators formerly appointed for that purpose; and that Mr. COLWALL be desired to speak to Mr. MARRE to be present, and furnish materials necessary for that observation.

Mr. HOOKE mentioned, that he had a pocket-needle, which would show the variation of the needle. He was desired, upon further consideration, to give a particular account of it to the society.

The operator acquainted the society, that some May-dew was gathered with napkins; and he was ordered to send some glazed earthen pans to Highgate for the gathering of it; and Sir ROBERT MORAY was desired to take care for it there.

Mr. HOOKE was ordered to try some experiments of refraction by himself, and to acquaint the society at their next meeting with the success thereof.

May 24. Sir THEODORE DE VAUX was admitted.

Dr. MALACHY THRUSTON was elected and admitted.

Mr. HOOKE having acquainted the society, that he had found the refraction of oil of turpentine upon water to be the same with that of water alone, the experiment was made before the society, which verified the account given, viz. that in both these, the inclination being thirty degrees, the angle of refraction was $40^{\circ} 43'$. And it was conjectured by Mr. HOOKE, that the upper and under surfaces of the oil

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being

being parallel, was the cause of the non-alteration of the refraction, with more thickness of the oil of turpentine.

There was also an account given of silk-worms eggs, hatched in an exhausted receiver; but the glass having admitted water by the sun's melting the cement, the experiment was ordered to be repeated against the next meeting.

There was read a letter to Mr. HOOKE from Dunkenhall in Lancashire, dated 16 May, 1665, concerning caterpillars, that seemed to be produced of the downy palms of fallows. It was ordered, that if the season were not past, Mr. Hooke take care to make the observation himself.

Dr. GODDARD moved, that the writer of this letter might be written to, that he would keep these insects, and observe whether they do not turn into flies.

Sir ROBERT MORAY moved, that both the changes in the generations of animals, and the steps of the growth of vegetables, might be more frequently and accurately observed than hitherto, by the help of microscopes. For observations of the growth of vegetables he named beans, as growing fast.

There was tried an experiment of injecting about 8 or 9 drops of spirit of tobacco into the vein of a dog, with this effect, that the dog, a little while after the injection, grew sick and vomited.

Dr. WILKINS, Mr. DANIEL COXE, Mr. THOMAS COXE, and Mr. HOOKE were appointed to take care of injecting the blood of one dog into the vein of another; and Mr. THOMAS COXE was particularly desired to try the changing of dog's skins.

Mr. THOMAS COXE related, that he had made an experiment of injecting the blood of one pigeon into the vein of another, by opening the vein of one, and letting it bleed, till the pigeon was almost expiring; and then letting out the blood of another pigeon, and injecting it into the dying one, and thereby keeping it alive for half an hour, after which it died, as the other pigeon did, though a pretty while after.

Mr. BOYLE produced a monstrous head of a colt, put into spirit of wine, with a double eye in the midst of its forehead, having double eye-lids, and double pupils. Mr. HOOKE was ordered to draw the picture of it, and then to dissect it.

Mr. THOMAS COXE related, that he could save a boar-cat with the spirit of *asa fetida*, as he had done a female cat, poisoned with tobacco-oil.

Mr. WILLUGHBY moved, that most corruptions of bodies turning to mites, ways might be thought on to destroy them; and having proposed that of smoking them with brimstone, he desired advice about instruments fit to convey smoke.

The president acquainted the society, that an experiment had been made of observing the variation of the needle; and that the King had been pleased himself to make the observation on the Friday preceding in Whitehall garden, and had found no variation at all, the needle standing in the Meridian.

It was ordered, that this variation be prosecuted; and that Mr. MARRE be called upon for his apparatus necessary thereto.

The following experiments were appointed for the next meeting.

1. Seeds of an hasty growth to be put into an exhausted receiver, to see, whether they would come up.
2. Silk-worms eggs to be put again into an exhausted receiver, to see, whether they would hatch.
3. The experiments of refraction to be prosecuted.
4. *Taints* to be given to a dog.
5. To try the saving of a she-cat, that hath taken the poisonous oil of tobacco, with the spirit of *asa fetida*; and to try, whether this spirit of *asa fetida* would save a boar-cat, that hath taken the same quantity of the like poisonous oil, that the she-cat hath taken.
6. To try the injecting of the blood of one dog into another.
7. To try the opening of a dog's sternum on both sides, to see, whether he would breath after it.

May 29, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t

Mr. AERSKINE

Sir ROBERT MORAY

Sir WILLIAM PETTY

Mr. PALMER

Dr. WILKINS

Dr. GODDARD

Dr. CROUNE

Dr. BALLE

Mr. GRAUNT

Mr. OLDENBURG.

It was ordered,

That Mr. SPRAT be desired to take notice in his history of the society what is meant by their council, when they grant an *Imprimatur*; and to draw up a draught concerning it, and offer it to the council.

That the president be desired to licence the fourth number of the *Philosophical Transactions*; and

That Mr. Hooke be urged to prosecute the grinding of glasses by his new engine.

Mr. Hooke mentioned to the council, that he had a way of making a short object-glass draw as much longer, as should be desired.

May 31, the monstrous colt's head was opened, wherein both the eyes were found together in one place in the midst of the forehead, and two pupils therein, and but one optic nerve^a. Mr. Hooke was appointed to give in writing a full description of all that was observable in this head, together with the scheme of the head.

It was ordered, that Mr. Boyle be asked by Mr. Oldenburg, whether this colt had any other monstrosity in its body; Dr. Goddard suspecting, that the colt might have received a blow in the forehead, whereby the eyes might be thus forced together.

Mr. Howard presented the society with a sponge, in part petrified, after it had lain, as he affirmed, four years upon a boarded floor of a room about six inches above ground, in which room had been kept paper and seeds of plants not at all spoiled.

Sir Robert Moray produced a small piece of pure copper, taken out of a mine in Cornwall by Sir Sackville Crow.

Mr. Willughby produced pieces of an egg hardened to a kind of stoniness by lying in lime. All these curiosities were committed to Mr. Hooke for the repository.

Mr. Howard having presented the society with several curious exotic plants and flowers, had their thanks, and was desired to continue these presents from time to time, that they might be put upon the table at the meeting of the society.

Sir Theodore de Vaux produced a Latin paper of Sir Theodore Mayerne, concerning worms bred in the teeth of men. He was desired to leave this paper with the society, and to communicate likewise the receipt against such worms mentioned in that paper, and what other considerable papers he had of Sir Theodore Mayerne for the purpose of the society; which he promised to do.

Dr. Croune affirmed, that he had likewise heard of worms taken out of the teeth; concerning which he would make farther enquiry, and give the particulars at the next meeting.

Sir Robert Moray affirmed the like of worms taken out of the gums of a man in Scotland.

^a Philof. Transact. n^o 5. p. 85, July 1665.

Dr. WILKINS surmised, that these supposed worms were nothing but the condensed sweat, squeezed out of the pores.

Col. BLOUNT presented two models of coaches, for the ease of both man and horse; of which he was desired to bring the description in writing.

Sir ROBERT MORAY moved, that it might be considered, how to make coaches of several sizes and forms, for the ease of one, two, three, or more persons; and how to improve single perches.

- Col. LONG remarked, that he had seen a cyclopic bird, the species of which was such; as also an unicorn's head, answering the description given of it in CÆSAR's commentaries and in PURCHAS; and likewise a fowl called a bear-killer, a kind of cassowary; which two letters he said were in the possession of Major SCOT, from whom he hoped to obtain the liberty of producing them to the society.

Sir ROBERT MORAY presented the society with twenty Morisco coins dug up about Tangier.

There was read a second letter written from Dunkenhall to Mr. HOOKE, about insects found in the palms of fallows; mentioning, that by a second and more accurate observation there were found little eggs in the down of those palms, which were the original of those caterpillars before supposed to be bred out of the little green thing in the center of the downy globules.

The experiments of refraction were deferred till the next meeting; and Mr. HOOKE was ordered to have the vessel of the refracting engine made larger, in order to try several quantities of liquors.

Dr. PELL suggested, that in the experiments of refraction many times that may be imputed to the medium, which is caused by the figure of the liquor put to trial; and that the liquor may vary its figure, according to its quantity and the capacity of the vessel containing it; as also, that different liquors will have different convexities, upon the account whereof they may differ in their refraction, rather than upon the account of their nature.

The president moved, that in order to discover what alteration in refraction the thickness of the medium makes, experiments might be tried with a plano-convex-glass, and several plain glasses behind it, to make the medium thicker.

The experiment of opening the dog's sternum was deferred till the next meeting.

The dog, who had the eight or nine drops of tobacco-oil injected at the last meeting, being inquired after, the operator affirmed, that he was well.

It was ordered, that the experiment of injecting the blood of one dog into another be tried at the next meeting; upon which occasion Dr. CROWE suggested, that a common pipe might be used for both, in order to have thereby the blood of one dog sucked out by the other.

June 7. Dr. WILKINS made a report of an experiment committed to his care, viz. that a dog's belly had been opened, and out of the *vena cava* there was let blood to the quantity of 5 or 6 ounces into a bladder, having a small pipe of brass fastened to it in the manner of a clyster-pipe, the end of which being put into the crural vein of a bitch, there was, by pressing the said bladder, about two ounces of blood injected into that vein, but without any sensible alteration in the bitch: that afterwards, in either side of the same dog's thorax there were cut two holes, each of an inch bigness; whereupon tho' the dog endeavoured very much to breathe, yet he was not able to move his lungs, nor draw any breath, except the wound were stopped by the finger; but that being taken off, the animal grew presently breathless and expired.

This experiment was attested by Sir WILLIAM PETTY, Mr. WILLUGHBY, Mr. DANIEL COXE, and Mr. HOOKE, who had been present at the making it.

Mr. DANIEL COXE related, that having mixed some cold common water with the tobacco-oil, and given it to a cat, the animal had not been killed, as others used to be with tobacco-oil alone.

It was ordered, that the experiment be made before the society both with tobacco-oil and water mix'd together, and with each of these apart, giving one of them after the other.

Mr. DANIEL COXE likewise observed, that he had heard, that scurvy-grass-oil would also occasion convulsions, and had the like operations upon animals with that of tobacco.

It was ordered, that Sir ROBERT MORAY should desire Mons. le FEBURE to furnish the society with some of that oil for trying this experiment.

Mr. HOOKE reported, that he had sown some lettuce-seed upon earth in the open air; and at the same time upon other earth in a glass-receiver, which was afterwards exhausted of air; that the seed exposed to the air was grown up an inch and an half high within eight days; but that in the exhausted receiver not at all: both which were produced and shewn the society.

Whereupon it was ordered, that air should be let into the exhausted receiver, to see whether any of the seed would come up between this and the next meeting.

It was ordered also, that the next day, June 8, about five in the evening, the variation of the needle be observed in Whitehall by the same committee formerly appointed for it, viz. the president, Sir ROBERT MORAY, Sir PAUL NEILE, Dr. WREN,

WREN, Mr. OLDENBURG, and Mr. HOOKE; and that Mr. MARRE and Mr. BOND have notice given them by the operator, to bring their needles and instruments to the said place.

Sir THEODORE de VAUX brought in the Latin receipt of Sir THEODORE MAYERNE, which he had promised, for the worms growing in the gums.

Sir ROBERT MORAY produced a piece of a stone, said to be taken out of the midst of a Portland stone, and having some parts of it crystallized, sticking about the opaque part of the stone.

Dr. MERRET affirmed, that he had very many sorts of them found in lead mines, and yielding excellent lime.

The president was desired to put Mr. PEPYS in mind of the diver for the diving experiments in this season.

It was ordered, that the experiments begun the last summer upon St. Paul's steeple be resumed and pursued; and that the curator provide the apparatus necessary for it against the Monday following in the afternoon about four of the clock; the curators of these experiments being the president, Sir ROBERT MORAY, Sir WILLIAM PETTY, Dr. WILKINS, Dr. GODDARD, Mr. OLDENBURG, and Mr. HOOKE.

Dr. POPE mentioned, that he had seen at Paris a fellow walking upon the water by means of a pair of leather breeches made bladder-wise, with pipes to them to blow them up, and with legs joined thereto, liquored after a peculiar way.

Mr. HOOKE said it might be thought upon to contrive a way of making a girdle to be tied about a man to save him from sinking. He was ordered to think upon it himself.

He mentioned a certain wheel to go in both over land, and bogs and water.

It was objected, that in plain grounds such a contrivance would be of use, but in ascents useless; yet it was moved, that Mr. HOOKE should endeavour to have a wheel made for a trial.

It was ordered, that there be provided against the next meeting a dog and some male vipers, to try whether in this hot weather their biting be mortal; and that it be done with vipers newly taken.

Dr. POPE mentioning his having brought some viper-powder from Venice, was desired to furnish the society with some of it; which he promised to do.

There were made some experiments of refraction, viz. 1. With water alone. which standing at an angle of inclination of 30° had an angle of refraction of

40°

40° 44'. 2. With spirit of turpentine alone of 45° 54'. 3. With water and spirit of turpentine together of 40° 44': The same with water alone. 4. With common oil of 45° 20'. 5. With common oil and spirit of turpentine together of 45° 20': The same with common oil alone.

June 14. CHARLES earl of Carlisle was proposed candidate by Sir PAUL NEILE, and unanimously elected.

Sir ROBERT MORAY produced a bone conceived to be petrified in a gravel-pit. Some of it being weighed, viz. $1 \frac{1}{2}$ ounce and $1 \frac{1}{2}$ grains, was found to have lost $\frac{1}{4}$ of an ounce and 22 grains by heating it red hot, and keeping it in the fire about $\frac{1}{2}$ of an hour. In this burning it had not the smell of a bone; but yet was not judged by the members to be truly petrified.

Mr. HENSHAW presented the society with the *Exuvie* of a viper found by himself in his orchard, where it had seemed to him recently cast, having in its head the cornea's of both the eyes, through which an object being looked upon seemed to diminish.

Dr. WILKINS produced the skin of a monstrous lamb sent him out of Cambridgeshire, having seven legs, two bodies, two tails, and only one head: which he left with the society, promising, in case it should not be redemanded of him, to bestow it on the society for their repository.

An account was given of the experiment of the growth of garden-creffes in a receiver, after air was admitted to it; whereby in the space of one week it was grown up to the height of two or three inches; whereas during the whole week before, when the receiver stood exhausted, it did not grow at all.

Col. BLOUNT proposed and discoursed of models of chariots, which he was again desired to give a description of in writing.

There was read a letter of Monfr. HUYGENS to Sir ROBERT MORAY, dated at the Hague, May 29, 1665, N. S. ¹ giving notice of Mr. HEVELIUS's having printed a treatise of the late comets ² in sixty sheets in folio, and expressing his apprehensions about the difficulty of making Mr. HOOKE's new grinding instrument to succeed.

The experiment of having a dog bitten by a black male viper was tried; the event of which was, that the dog swelled much at the lip, where he was bitten, and foam'd, but was recovering.

The experiment was also tried of giving a drop of tobacco-oil drawn in England to a she-cat, and of following it presently with two or three drops of the spirit of *asa fetida*; the event being, that the cat was very sick, yet she recovered.

¹ Letter-Book, vol. i. p. 268.

² Prodomus Cometicus.

The fame was tried upon a great and lusty boar-car, which, though very sick too, recovered likewise.

It was ordered, that the committee appointed for observing the variation of the needle meet again the next morning about eight of the clock in Whitehall garden, in order to prosecute that business, whereof Mr. MARRE and Mr. PHILIPS brought in their observations made June 8, which were ordered to be kept.

It was ordered likewise, that the apparatus for making the experiments at St. Paul's be made ready for the week following:

That at the next meeting the experiments of refraction be prosecuted: And

That it be tried, whether a cat poisoned with tobacco-oil can be recovered with common water, either mixt with it or given presently after it.

June 20, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t

Mr. HOWARD

Sir ROBERT MORAY

Sir PAUL NEILE

Sir WILLIAM PETTY

Mr. AERSKINE

Dr. WILKINS

Dr. GODDARD

Dr. CROUNE

Dr. BALLE

Mr. GRAUNT

Mr. OLDENBURG.

It was ordered, that the president be desired to move it at the next meeting of the society, that, by reason of the present contagion, it would be convenient to intermit their publick weekly meetings, until the sickness cease, and the president with the advice of the council summon them to meet again:

That the curator, amanuensis, and operator, during this intermission, be employed by the direction of any three of the council in business relating to the design and work of the society; of which three the president, vice-president, Sir ROBERT MORAY, Sir WILLIAM PETTY, Dr. GODDARD, the treasurer, either of the secretaries, Dr. CROUNE, or Mr. COLWALL should be one:

That on the day following, being the next meeting of the society, those, who should be present, and were in arrears, should be put in mind of it by the president, and desired to pay the same, before the society intermit their public meetings: And

That upon a report of Sir WILLIAM PETTY of his having perused the additions of Mr. GRAUNT to his *Observations upon the Bills of Mortality*, the president be desired to license the reprinting of that book, together with such additions: which was done accordingly.

June 21, the COUNCIL met again, there being present

The lord viscount Brouncker, preside

Mr. HOWARD
Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Sir WILLIAM PETTY

Mr. PALMER
Dr. WILKINS
Dr. GODDARD
Mr. HILL
Mr. COLWALL
Mr. OLDENBURG.

Sir PAUL NEILE moved, that the amanuensis might be ordered to attend Sir ANTHONY MORGAN, and to desire of him the papers, which relate to the society in the matter of Chelsea-college, and to deliver them to Dr. WILKINS; who should be desired to find out a fit person, who might in the absence of Sir ANTHONY MORGAN attend the attorney-general for the prosecuting this business concerning Chelsea-college: which was ordered accordingly.

At the meeting of the SOCIETY on the same day,

The president having proposed an intermission of the meetings of the society by reason of the present contagion in London, the society approved of it, and resolved to discontinue their assemblies on the Wednesday following, until the president, by advice of the council, should summon them to meet again.

Mr. HOOKE produced a sextant contrived by himself, and explained the use and structure thereof, viz. that it was made after the manner of a pair of dividing compasses, there being two three-feet tubes opening upon a joint in the manner of the legs of compasses, and a long strait screw moving in two motions, serving to take angles very exactly.

It was moved by Sir PAUL NEILE, that this instrument might be examined, to see whether it performed what it was intended for, by measuring some known distances with it: And it was ordered thereupon, that this should be done.

Mr. HOOKE produced some curiosities addressed to him by Mr. WILLIAM JUMPER, viz. certain tongues, and teeth, and eyes, called serpents-tongues, &c. said to be found frequently at Malta, and knock'd out of that rock only where St. PAUL suffered shipwreck. They were ordered to be put into the repository.

Dr. WILKINS likewise presented the society with some curious stones, as large Cornish diamonds, *lapidis stellaris*, serpentine stones, some other sorts of petrified shells, &c.

Sir ROBERT MORAY mentioned, that prince RUPERT had contrived and made use of a quadrant to take altitudes with, viz. by a perpendicular, which, as soon as by raising the hand, the eye brings the sight upon the object, the height of which is to be taken, the ruler moving all the while perpendicularly is with a trickier clapt fast to the side of the quadrant, thereby marking, without wavering and exactly, the altitude required: which contrivance was esteemed most useful for such observations at sea, in regard of the wavering of the hand by the motion of the ship.

It was order'd, that the variation of the needle be again observed between that and the next meeting.

Mr. DANIEL COXE and Mr. THOMAS COXE were put in mind to prosecute the experiments with antidotes to save cats poisoned with tobacco-oil.

Col. BLOUNT being desired, that his chariot might be brought into the court of Gresham-college at the next meeting, promised, that it should be done.

He was put in mind to give in writing a short description of the several models of chariots proposed by him, and produced before the society.

Occasion being given to discourse of the art of flying, and Dr. WREN being desired to leave with the Society what he had considered on this subject, promised to do so.

He affirmed, that a man would be able so often to move the wings, as he could with double his own weight on his back ascend a pair of stairs built at an angle of 45 degrees.

Mr. HOOKE suggested, that it was not sufficient to have a theory for the descent of an expanded area perpendicularly downward, because the descent of an expanded area, moved edgewise horizontally in the air, was extremely different; in which way however all motion of flying must be performed.

Dr. WREN being desired to leave what he had done about the late comets, promised to do so.

He moved, that an experiment might be made, whether the point of a magnetic needle being sharpened with all exactness imaginable, the needle would return to the same point, himself having found, that it would not.

Dr. GODDARD mentioned, that some variation might possibly happen from the very shape of the needles; and that it seemed to be requisite, that a proportion of the metal should be observed in respect of the length thereof.

The operator being called upon to give an account, how the dog did, that was bitten at the last meeting by a viper, affirm'd, that he swelled much more the next day, and was very sick, so that he would eat nothing; but that on the Friday after he recovered his appetite, and grew well.

Mr. DANIEL COXE affirm'd, that at Line in a chalk-pit running quicksilver had been found among the chalk.

The lord BRERETON observed likewise, that in an inn in St. Alban's mercury was found running in a saw-pit.

June 28, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t
 Sir ROBERT MORAY
 Mr. AERSKINE
 Sir WILLIAM PETTY
 Dr. GODDARD

Dr. BALLE
 Mr. COLWALL
 Mr. GRAUNT
 Mr. OLDENBURG.

It was order'd, that the president be desired to license the fifth number of the *Philosophical Transactions*, written in four sheets of paper in folio: And

That the president be desired to sign the allowance to Mr. Hooke as curator to the society, tho' the sum exceed five pounds.

At the meeting of the SOCIETY on the same day,

Monfr. HUGUES LOUYS DE LYONNE¹, and Monfr. VITAL DE DAMAS² were admitted fellows of the society. For the entertainment of these two foreigners some of the experiments formerly made were repeated, tending to shew, that the air is a dissolvent of combustible bodies³.

Sir ROBERT MORAY presented the society with a curious stone, of which he had received this relation, that within four miles of the tomb on the side of Loughneach in Ireland there was a well, which produced this kind of stone; several hundreds of people meeting there every first day of May, and cleansing the well, the bottom of which was said to be an hard kennel-rock, which made a cracking noise; whereupon these stones were thrust out to a great number.

It was order'd, that some of the members of the society, who were in Ireland, be written to, to enquire after the truth of this relation: As also that the curator try to dissolve this stone with *aqua fortis*, in order to see, whether any mineral be contained in it; and that he try likewise, whether it would burn.

Sir THEODORE DE VAUX communicated a Latin paper found among the writings of Sir THEODORE MAYERNE, relating to the preserving timber and other wood for a great while from putrefaction and being worm eaten; and containing likewise a method of salting beef, that should keep a great while: Which paper was ordered to be filed up.

It was resolved, that the public assemblies of the society be henceforth discontinued, till summoned by the president to meet again.

The members of the society were then exhorted by the president to bear in mind the several tasks laid upon them, that they might give a good account of them at their return; and Mr. Hooke was ordered to prosecute his chariot-wheels, watches, and glasses, during the recess.

¹ Son of Monfr. DE LYONNE, secretary of Arts to LEWIS XIV. of France.

² Agent of the French merchants. See Mr.

OLDENBURG's letter to Mr. BOYLE, of July 4, 1665. BOYLE's Works, vol. v. p. 331.

³ Ibid.

Upon

Upon this discontinuance of the meetings of the Society, on account of the spreading of the plague throughout London and Westminster, most of the members retired into the country. But Mr. OLDENBURG, one of their secretaries, continued during the height of the distemper, and through the whole summer and following winter, at his house in Pall-mall, Westminster, whence he frequently wrote to Mr. BOYLE, who resided then at Oxford, and others of his friends, and to his foreign correspondents, and particularly to Mr. HEVELIUS of Dantzick.

In his letter to Mr. BOYLE of the 4th of July, 1665*, he takes notice, that their noble president's neighbourhood, but two houses distant from his lordship's, was infected; and adds, "I know not whether this dreadful neighbour will occasion him to alter his thoughts for a removal. It is a great mercy, that Southwark and Rotherhith, where seamen are so numerous, and other people, that relate and work in the navy, remain so free yet of the contagion, that there are not above two houses shut up in those quarters. If it should come into this row, where I am, I think I should then change my thoughts, and retire into the country, if I could find a sojourning corner. In the mean time I am not a little perplexed concerning the books and papers belonging to the Society, that are in my custody: all I can think of to do in this case is, to make a list of them all, and to put them up by themselves in a box, and seal them together with a superscription, that so, in case the Lord should visit me, as soon as I find myself not well, it may be sent away out of mine to a sound house; & sic deinceps."

It appears from this letter, that the fifth number of the *Philosophical Transactions* was then ready for publication; at the close of which is an advertisement; that "by reason of the present contagion in London, which may unhappily cause an interruption as well of correspondencies as of public meetings, the printing of these *Philosophical Transactions* may possibly for a while be intermitted, though endeavours shall be used to continue them, if it may be." But none were published till November following.

Mr. OLDENBURG wrote again to Mr. BOYLE on the 10th of August†, that he had now put all his affairs and papers in order, separating what belonged to the Royal Society, to Mr. BOYLE, &c. from his own, intending at the very beginning of his indisposition, if he should be seized, to have those papers conveyed to an healthy place. In another letter of the 24th of that month he returned his acknowledgements to Mr. BOYLE for imparting to him somewhat of his philosophical employments at Oxford; and expressed his satisfaction, that some other members of the Royal Society were active also, and likely to give a good account of their spent time at their meeting again. In a third letter written on the 29th of the same month‡, he remarks, that it would be obliging to the public, if Mr. BOYLE would print that catalogue, mentioned by him, of the antipestilential medicines; which would be most conveniently done at Oxford, the London stationers and printers having for the most part retired into the country, as well as others. "I ac-

* BOYLE'S Works, vol. v. p. 320.

† Ibid. p. 332.

‡ Ibid. p. 332.

"know-

"knowledge, continues he, that that jealousy about the first authors of experiments, which you speak of, is not groundless; and therefore offer myself to register all those, you or any person shall please to communicate as new, with that fidelity, which both the honour of my relation to the Royal Society (which is highly concerned in such experiments) and my own inclinations do strongly oblige me to."

Mr. BOYLE in a letter to Mr. OLDENBURG from Oxford, dated Sept. 30,⁴ mentioned, that there being then in that city Sir ROBERT MORAY, Sir PAUL NEILE, Sir WILLIAM PETTY, Dr. WALLIS, Dr. COXE, Capt. GRAUNT, and Mr. WILLIAMSON, he had put them in mind, that as there were then no inconsiderable number of the Royal Society, so that the King seeing Sir ROBERT MORAY and Mr. BOYLE, with some others, took notice of it; it seemed proper for them to meet, though not as a society, yet as a company of virtuosi, and to renew their meetings. Upon which, being desired to name the day and place, he proposed Wednesday as an auspicious day, having been that of their former assemblies, and his own lodgings for the place of meeting, till they could be better accommodated. This being agreed to, the members mentioned above met at his lodgings, where, besides their discourse on various subjects, he shewed some experiments, particularly one of turning a liquor like fair water in a moment into an inky substance, and presently changing that first into a clear liquor, and then into a white one almost like ink.

Mr. OLDENBURG in his answer of Octob. 5, 1665⁵, thanked Mr. BOYLE for his account of what was done by him and others of the society at Oxford, adding: "Methinks you are so many fellows of the society, that you can make more than a *quorum*, but that you want the president. I rejoice to find by yours, that you intend to make so good use of that opportunity as you did; and I hope since you are so many, and so considerable ones of our body, you will make it a part of your business to insinuate the designs of the society into the Oxonians, that they may relish them as much as most of them have been reported to disgust them, and give them cause to prefer that solidity of knowledge the said society aims at, before scholastical intentions."

Mr. BOYLE in his letter of Octob. 14,⁶ remarks, that at their meeting on the Wednesday preceding at Dr. WALLIS's, two letters of Mr. OLDENBURG to Sir ROBERT MORAY had been publicly read, which administered occasion of much discourse; and that himself had exhibited some experiments, particularly with the poison drawn from tobacco, and an easy way of suspending Mercury in a pipe open at both ends, and held perpendicular, though nothing kept it from falling but the resistance of the subjacent water in an open vessel.

Mr. OLDENBURG in his answer of the 17th of October⁷, mentions his having his papers ready for a sixth number of the *Philosophical Transactions*, to be printed the first Monday in November, after they should be reviewed by his Oxonian

⁴ Supplement to the Letter-Book, vol. iv.
p. 38.

⁵ BOYLE'S Works, *ubi supra*, p. 337.

⁶ Supplement, *ubi supra*, p. 39.

⁷ BOYLE'S Works, *ubi supra*, p. 340.

friends; and accordingly that number was published on Monday Nov. 6, 1665, with this preface, that "an opportunity being presented to revive the publishing of these papers, which for some months had been discontinued by reason of the great mortality in London, where they were begun to be printed, it hath been thought fit to embrace the same, and to make use thereof for the gratifying of the curious, that have been pleased to think well of such communications."

The seventh number published on the 4th of December, was printed at Oxford, as was likewise the 8th published on the 8th of January 1666; but the 9th for February, and all the subsequent ones, were printed at London.

During the recess of the society Mr. OLDENBURG kept up his correspondences with several of the learned men abroad, and particularly HEVELIUS; the letters which passed between them being extant in the Letter-Book*. In one of these, dated January 24, 1666†, he informs that great astronomer, that some members of the Royal Society having examined the difference between him and Monsieur Auzout, concerning the motion of the late comet, had determined in favour of the latter; the Italian, French, and Dutch, as well as English astronomers, being found to concur in their observations with Monsieur Auzout in opposition to HEVELIUS.

Another active member of the Royal Society, Mr. HOOKE, before he left London, wrote to Mr. BOYLE on the 8th of July, 1665‡, his sentiments concerning the cause and nature of the plague. "I cannot, *says he*, from any information I can learn of it, judge what its cause should be; but it seems to proceed only from infection or contagion, and that not caught but by some near approach to some infected person or stuff. Nor can I at all imagine it to be in the air, though yet there is one thing, which is very different from what is usual in other hot summers, and that is, a very great scarcity of flies and insects. I know not whether it be universal; but it is here at London most manifest. I can hardly imagine, that there is a tenth part of what I have seen other years."

The week after the writing of this letter he accompanied Sir WILLIAM PETTY and Dr. WILKINS to Durdens, a seat of the lord BERKLEY near Epfom in Surry, where several experiments were made during their recess; an account of which was brought into the society, after their return to Gresham-College.

Feb. 21, 1666, the COUNCIL of the Royal Society, after a long interruption caused by the contagion, met again in the usual place in Gresham-College, viz.

The lord viscount Brouncker, presid†

Sir PAUL NEILE

Dr. WILKINS

Dr. GODDARD

Dr. CLARKE

Mr. PALMER

Mr. COLWALL

Mr. GRAUNT

Mr. OLDENBURG.

* Vol. i. p. 275, &c.

† P. 291.

‡ BOYLE'S Works, vol. v. p. 535

The time of summons for opening again the weekly meetings of the society being considered of, it was resolved, that it be left to the president to summon the fellows to meet on the second Wednesday in March, if his Lordship should find no cause to the contrary.

It was resolved, that the fifty pounds in cash, that were formerly presented by Mr. COLWALL, be delivered out to be added to another fifty pounds presented by him, to pay for the collection of rarities formerly belonging to Mr. HUBBARD^y.

It was ordered, that the ninth number of the *Philosophical Transactions* be printed by JOHN MARTYN and JAMES ALLESTRY, printers of the society.

It was resolved, that the council meet on the Monday following, the 26th instant, without summons.

Feb. 26, at the meeting of the COUNCIL were present

Dr. WILKINS, vice-president
Sir PAUL NEILE
Dr. GUDDARD
Dr. CLARKE
Mr. PALMER

Mr. COLWALL
Mr. HILL
Mr. GRAUNT
Mr. OLDENBURG.

It was ordered, that the several members of the council, who had particular acquaintance with those lords of the society, who were in arrears, should be desired to recommend to them those letters, which formerly were drawn up, to put them in mind of satisfying such arrears; and that accordingly the president be desired to give to the earl of Northampton the letter addressed to him; the lord bishop of Exeter and Sir ROBERT MORAY, that to the marquis of Dorchester; Sir ROBERT MORAY, that to the duke of Buckingham; and Dr. WILKINS, that to the lord HATTON.

^y Mr. OLDENBURG in a letter to Mr. BOYLE, dated 24 February, 1662, three weeks after this meeting of the council (BOYLE's works, vol. v. p. 35c.) files this *a very handsome collection of natural things*; and adds, "We are now undertaking several good things, as the collecting a repository; the setting up a chemical laboratory, a mechanical operatory, an astronomical observatory, and an optic-chamber: but the paucity of the undertakers is such, that it must needs stick, unless more come in, and put their shoulders to the work. We know, Sir, you can, and will do much to advance these attempts; and we hope the heavens are reconciled to us, to free us from the infection, and to return you to London.—The arrears of the

"society amount to above 600*l*. How to get them paid is the question?" He takes notice, that the lord viscount Brouncker would now by all means be released of his presidentship, and was so peremptory in his resolution, that it would be very hard to engage his lordship for another year. "I know, Sir, continues he, they [the society] have an eye upon you for his successor, thinking it very important to choose persons into that chair, in whom birth and ability are in conjunction; and I would fain persuade myself, you will neither injure them nor yourself so much, as to decline that honour, especially since it will not oblige you to such assiduity, as is indispensable, provision being ready to supply your place upon occasion."

It was ordered, that the collector make haste to go about with the general list of arrears, and use all diligence to gather them in; and that in doing so, he take particular notice of those, who refuse or delay payment.

Resolved, that the amanuensis make several copies of the following order, for those, who are hereafter named, inserting their names, and the sums of their arrears, and carry them to the president to be signed:

The form of the said order;

“ Ordered, that the collector to the treasurer of the Royal Society do repair to ——— and give him notice, that he is in arrear the sum of ——— due to the Royal Society on the 23d of December last past, according to his subscription and the statutes of the said society; and do desire him to pay the said sum unto the said collector, who, in case of non-payment, is to return his answer unto the council of the said society.”

The persons are these

Mr. VERMYDEN
Mr. WALLER
Dr. TERNE

Mr. STANLEY
Sir JOHN TALEOT
Mr. STANHOPE

Dr. SCARBURGH
Mr. DRYDEN.

March 12, at the meeting of the COUNCIL were present

Dr. WILKINS, vice-president
Dr. GODDARD
Dr. CLARKE

Mr. COLWALL
Mr. GRAUNT
Mr. OLDENBURG.

It being signified by Mr. OLDENBURG, that the president had perused the *Philosophical Transactions* designed for this month, viz. n° 10, and given his consent for the publishing of them; those, who were present, gave their consent likewise for it, to make up the *quorum* of seven, requisite for giving licences.

March 14, after above eight months interruption, occasioned by the public calamity of the plague, the SOCIETY opened their meetings again upon a summons sent out by the president, as it had been ordered at their last meeting, June 28, 1665.

Captain GEORGE COCK was proposed a candidate by the president; and WILLIAM HARRINGTON, esq; by Dr. WILKINS.

Mr. OLDENBURG presented to the society from Mr. BOYLE his *Hydrostatical paradoxes*, the perusal of which was recommended to Dr. WILKINS, who was desired to give an account thereof to the society.

He presented likewise from Monsieur PETIT his dissertations upon the two late comets in December 1664 and in April 1665; the reading of which was recommended to Mr. HOOKE, that an account thereof might be given to the society.

Mr. OLDENBURG presented also from Mr. EDWARD DIOGES a couple of Virginian silk-worm-bottoms of an extraordinary bigness, equalling almost a hen's egg; and he mentioned from the presenter's mouth, that generally those bottoms were of that magnitude in that plantation; and that about four pounds of these bottoms would yield a pound of silk, whereas there must be seven pounds of the ordinary ones for a pound of silk.

Dr. WILKINS produced some seeds sent by Mr. JOHN HINDE from Bermudas, producing a tree of about eight feet high, and a fine flower. The seeds themselves were affirmed to have a purging and vomiting quality; and three parts of four of them turning to oil, it was esteemed a sovereign remedy for aches, and good for common use.

Mr. WILLIAMSON mentioned, that he had received news from Florence, that there was coming to England a person with an engine for destroying ships; and that at his arrival the invention would be referred to the examination of the society.

The president inquiring into the employments, in which the members of the society had been engaged during their long recess, several of those, who were present, gave some account thereof: viz.

Dr. WILKINS and Mr. HOOKE of the business of the chariots, viz. that after great variety of trials they conceived, that they had brought it to a good issue, the defects found, since the chariot came to London, being thought easy to remedy. It was one horse to draw two persons with great ease to the riders, both him who sits in the chariot, and him who sits over the horse upon a springy saddle; that in plain ground 50 pound weight, descending from a pulley, would draw this chariot with two persons. Whence Mr. HOOKE inferred, that it was more easy for a horse to travel with such a draught, than to carry a single person: That Dr. WILKINS had travelled in it, and believed, that it would make a very convenient post-chariot.

It was ordered, that Dr. WREN and Mr. HOOKE should join in mending what might be amiss in this chariot, and endeavour to bring it to perfection.

Mr. HOOKE gave an account of what experiments he had made by weighing bodies in a very deep well, and above ground; and that he had found no difference in their weight in those different places. He was ordered to bring in these experiments in writing.

* See his letters to Mr. BOYLE of August 15, and Sept. 26, 1665, in BOYLE'S Works, vol. v. p. 544.
Sir

Sir ROBERT MORAY gave an account of his employment in trying of ores brought him out of a mine in Wales, relating, that he had made it part of his business, to try, whether he could extract all the lead of the ore of that mine at one operation, with small expence, in a short time; and that he had found, that whereas ordinarily but about 40 pound was extracted out of 100 pound, he had extracted near 70 pound; which, as it was considerable, in regard of the quantity of lead, so it was presumed it must be so likewise in respect of the quantity of silver to be extracted out of so much more lead. He added, that he had made trials also both upon litharges, the red and the white, and obtained 14 ounces of lead, out of a pound of such sort of litharge; but that that of the white was not so fair, as that of the red. He said farther, that the occasion given him to set upon this kind of experiments had been, that Sir GEORGE HAMILTON having a silver mine in Ireland, and suspecting that it might yield more than was extracted, caused his workman to apply himself to this work with more care and labour; and thereupon obtained, instead of 14 or 15 pounds stirring out of a tun of lead, 50 pounds.

The president inquiring after the history of masonry, undertaken by Sir ROBERT MORAY, the latter said, that it was yet imperfect; but the president pressed him to bring it in as it was.

Mr. DANIEL COXE gave some account how he was employed in examining the nature and figure of all sorts of salts, and that he had made a good number of experiments upon that subject; intimating, that he conceived, that the origin of all salts was sea-salt. It being demanded, how then, and by what he distinguished salt? it was answered, by the alteration of the figure caused by the addition or mixture of something else.

He was urged to go on vigorously in so noble a subject; and to desire in it the conjunction of Mr. BOYLE, Sir ROBERT MORAY, Mr. HENSHAW, Dr. GODDARD, and Mr. HOOKE.

Sir ROBERT MORAY pressed particularly, that the nature of salt petre might be well inquired into.

Dr. CLARKE being called upon for his history of the injection into the veins, gave answer, that he had not neglected it, and intended to finish it, as soon as possible he could, for the press.

Sir ROBERT MORAY took hence occasion to speak of the transfusing of the blood of one animal into another, attempted by Mr. BOYLE, as a considerable experiment, if it could be practised.

Dr. CLARKE affirmed, that above two years before he had endeavoured to make that experiment, but found it so difficult, that he gave it over.

Sir ROBERT MORAY intimated, that Mr. BOYLE was of opinion, that the difficulties of this experiment might be mastered.

Dr. CLARKE related, that Dr. DICKENSON * at Oxford had turned three or four ounces of water into so much earth, without addition.

Sir ROBERT MORAY mentioned, that BAPTISTA PORTA affirmed, that he had changed sublimate into water, and made use of it to harden iron tools with that liquor; and that Mr. THOMAS VAUGHAN had assured him, that it would do.

Dr. CLARKE remarked, that Dr. DICKENSON had put a toad into an open glass, wherein it lived six months without any visible food, but after that time died, and dissolved into a jelly, which the next spring produced two live toads, which he kept, as he had done their parent before; and that they also dissolved at last into a liquor; but that out of this liquor no other toads were generated.

Dr. WALLIS being asked, what experiments had been made during the last summer at the committee of the society, which had frequently met at Oxford, related, that, among others, there had been tried divers musical experiments; whereof he mentioned some, but referred for more particulars to Mr. BOYLE, who had caused them to be put into writing. Mr. OLDENBURG was desired to write to Mr. BOYLE to communicate them.

March 21, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid ^t	Mr. PALMER
The lord bishop of Exeter	Mr. HILL
Mr. CHARLES HOWARD	Dr. WILKINS
Sir ROBERT MORAY	Mr. COLWALL
Sir PAUL NEILE	Mr. GRAUNT
Mr. AERSKINE	Mr. OLDENBURG.
Dr. GODDARD	

The president suggesting, that it would be necessary, that the society should proceed to the election of a new council and officers for the remaining part of the year; and it being according to the charter requisite, that there should meet for that purpose at least thirty-one of the fellows of the society for appointing a day for such election, it was ordered, that summons should be issued to this effect, viz.

That there being an extraordinary occasion for a full meeting of the society on the Wednesday following the 23th of March, 1666, the several fellows were desired not to fail to be then present at the usual time and place.

It was ordered also, that the amanuensis draw up for the next meeting of the council a fair list of all the fellows, in order to print new lists for the election-day;

* EDMUND DICKENSON, M. D. of Merton-College in Oxford, afterwards fellow of the College of Physicians in London.

and

and that he leave some space on the top of the paper for the names of his Majesty and the Princes, who were members of the society; and some space also at the beginning of every letter for occasion:

That Dr. WILKINS be desired to go to the lord chancellor, and to intreat his lordship, that he would please to appoint a time when the lords referees should meet about the business of Chelsea-College: And

That Dr. WILKINS and Dr. GODDARD do meet, in order to consider of a supplement to the charter of the society.

Dr. WILKINS and Mr. HOOKE were desired to look over the operator's bills, and, if they found them just, to set their hands to them. And it was resolved, that in case the public meetings of the society should be interrupted again, the salary of the operator should be abated for that interval.

At the meeting of the SOCIETY on the same day,

Capt. GEORGE COCK and Mr. WILLIAM HARRINGTON were elected.

Mr. JOHN COPLESTON was proposed candidate by Mr. GRAUNT.

Dr. CHARLTON related, that the notion concerning the vermination of the air, as the cause of the plague, first started in England by Sir GEORGE ENT, and afterwards managed in Italy by father KIRCHER, was so much farther advanced there, that, by the relation of Dr. BACON, who had long practised physic at Rome, it had been observed there, that there was a kind of insect in the air, which being put upon a man's hand, would lay eggs hardly discernible without a microscope; which eggs, being for an experiment given to be snuffed up by a dog, the dog fell into a distemper accompanied with all the symptoms of the plague: Dr. CHARLTON offering to bring Dr. BACON to give a full and punctual account of this matter, was desired to do so.

He mentioning likewise, that the masters of the Pest-house had promised him their observations of the plague, and Sir ROBERT MORAY moving, that queries might be thought upon to put to them, it was suggested by Sir PAUL NEILE, that he conceived it best to take first their observations nakedly, and afterwards to put queries to them; which was approved of by the society.

Mr. HOOKE brought in a small new quadrant, which was to serve for accurately dividing degrees into minutes and seconds, and to perform the effect of a great one. It had an arm moving on it by the means of a screw, that lay on the circumference. But the complete description of it was referred to the inventor.

He presented a paper, which was read, containing some experiments of gravity made in a deep well near Banstead Downs in Surry; to which was annexed the scheme of an instrument for finding the difference of the weight, if any, between a body

body placed on the surface of the earth, or at a considerable distance from it, either upwards or downwards. It was ordered, that this paper should be registered^b; as follow :

“ Gravity, tho’ it seems to be one of the most universal active principles in the world, and consequently ought to be the most considerable, yet has it had the ill fate, to have been always, till of late, esteemed otherwise, even to slighting and neglect. But the inquisitiveness of this latter age hath begun to find sufficient arguments to entertain other thoughts of it. GILBERT began to imagine it a magnetical attractive power, inherent in the parts of the terrestrial globe: the noble VERULAM also, in part, embraced this opinion; and KEPLER (not without good reason) makes it a property inherent in all celestial bodies, sun, stars, planets. This supposition we may afterwards more particularly examine: But first it will be requisite to consider, whether this gravitating or attracting power be inherent in the parts of the earth; and, if so, whether it be magnetical, electrical, or of some other nature distant from either.

“ First then, if it be magnetical, any body attracted by it ought to gravitate more, when nearer to its surface, than when farther off.

“ To examine which property, several trials have been made, both on the higher parts of Westminster-abbey, and also at the top of St. Paul’s-tower: But tho’ in the making of them, I endeavoured to be as accurate as the way was capable of, I took to try it, which was by counterpoising a heavy solid body, and as much brass-wire, as would serve to let down that body from the top to the bottom of the tower, and then poising these equilibrated bodies first, whilst the solid body and wire were in the scale at the top; and afterwards by poising them likewise, when the body was let down almost to the bottom by the wire, (whose upper-end was fastened to the scale at the top;) yet such were the inconveniencies, this way was subject to, from the vibrations of so long a line, and from the motion of the interposed air, that nothing of certainty could be collected from these trials; save only, that if there were any difference in the gravitation of the body, it was but very small and inconsiderable, since I found in the trials made from the top of the abbey, that a few grains put into this or that scale would manifestly turn the beam this or that way, notwithstanding the former inconveniencies. But to distinguish, whether there be any the least variety, there must be attempted some other way: of which by and by.

“ Next, if all the parts of the terrestrial globe be magnetical, then a body at a considerable depth, below the surface of the earth, should lose somewhat of its gravitation, or endeavour downwards, by the attraction of the parts of the earth placed above it.

“ This opinion some experiments, made by some worthy persons of this honourable society, seem to countenance. But considering the vast proportion of

^b Register, vol. iii. p. 93.

“ the decrease of gravity at so small a depth, it seemed not improbable, but that
 “ the moisture of the air, or some other unheeded accident, might intervene in the
 “ experiments, which might much contribute thereunto: For the trial of which
 “ I had a great desire, and happily meeting with some considerably deep wells,
 “ near Banstead-downs, in Surrey, I endeavoured to make them with as much
 “ exactness and circumspection as I was able. My first trials were in a well about 15
 “ fathom deep, or 90 foot; the packthread I made use of was about 80 foot long;
 “ the bodies I weighed, or let down by it, were brads, wood, and flints; each
 “ of which, at several times, I counterpoised exactly, and hung the scales, which
 “ were very good ones, over the midst of the well, so as that the packthread might
 “ hang down to the bottom without touching the sides. The effects were these,
 “ that each of those bodies seemed to keep exactly the same gravity at the bottom
 “ of the well, that they had at the top. For, trying it when the air was very calm
 “ and still, I found, that the weight of a grain would easily turn the scales either
 “ ways, according as it was put into the one or the other scale; which exactness
 “ of equipollency in the scale I found both before I let down the body by the pack-
 “ thread, when they were so let down, and after they were again drawn up; so
 “ that it seemed manifest, that about a pound weight, either of wood, flint, or
 “ brads, by being placed fourscore foot either nearer or farther from the center of
 “ the earth, did not vary its weight more than a grain; that is, not more than a
 “ 7680th part of its weight, by having eighty foot of earth situate above it;
 “ whereas the other experiments make it lose near a 16th part, at a depth not
 “ much greater.

“ This experiment I afterwards tried with the like circumspection in a well of
 “ near sixty fathoms deep, where the weight, tho’ suspended at the end of a string,
 “ of about 330 foot long, seemed to continue of the same weight, that it had
 “ above, both before it was let down, and after it was pulled up: for the beam of
 “ the balance, tho’ very tender, did in all those trials, (that is, before the weight
 “ was let down, when it was let down and suspended, and after it was again drawn
 “ up) keep, as to sense, exactly its horizontal parallelism or equilibration: So that
 “ this opinion, how probable soever it might seem to GILBERT, VERULAM, and
 “ divers other learned men, is not at all favoured by the experiments made in these
 “ wells; whether from the peculiar nature of the earth about these wells, which
 “ was a pretty solid chalk; or whether from some other cause, I determine not, till
 “ farther experiments evince it. But in truth, upon considering the nature of the
 “ theory aright, we may find, that (supposing the theory true, that all the con-
 “ sistent parts of the earth had a magnetical or attractive power) the decrease of
 “ gravity would be almost an hundred times less than a grain to a pound, at as great
 “ a depth as 50 fathom. For if we consider the proportion between the parts of the
 “ earth placed upon the one side of the stone below it, with the parts above it, we
 “ may find the disproportion greater. If therefore there be any such inequality of
 “ gravity, we must have some ways of trial much more accurate, than this of scales:
 “ Of which I shall propound two sorts, which, if there be any difference, seem ca-
 “ pable of distinguishing and finding it out.

The:

"The first is by the motion of a swing-clock: for if the attraction of the earth towards its center be leis, the farther the body is placed above or below its surface, then the motion of such a watch must be slower there than when placed on the surface: And though perhaps it be so small as not to be sensible at one, or ten, or perhaps an hundred vibrations, yet in many thousands of them, it will not be difficult to find it. But a clock for this experiment ought to be sealed up exactly in a glass, so that no air may have any intercourse with it; which is sufficiently easy; otherwise the changes of it may perhaps be rather ascribable to the air, which is most evidently of a differing constitution. And by this means (which I look upon as the most exact) I could wish, that trial were made at the top and bottom of some very high hill, that so, by the differing velocity of the clock, at the top of the hill, from that at the bottom, we might be able to judge, whether there be any such variation of gravity; and, if such there be, whether it be analogous to that of a load-stone.

"The other instrument for this purpose may be some such as this, described in the adjoining figure, which ought also to be well fortified against the mutations of the ambient air: otherwise in so nice an experiment nothing can be done.

"Now because the design of both these instruments is, to find out a difference of gravity, if there be any, to the end, that by comparing them with the attraction of the load-stone, we may the better judge of this supposition; it will therefore be requisite, to make several experiments on a good magnet, for the finding out of the decrease of the force of its attractive power upon a body, according as it is placed, at greater and greater distances. For which, I have contrived and designed to make an appropriate instrument. Which experiments, as they are wholly new, being not attempted hitherto (that I know) by any; and as they may afford many helps toward the finding out the true nature of the magnet, and the laws and reasons of divers other motions; so if this analogy between the decrease of the attraction of the one, and of the gravity of the other, be found real, we may perhaps by the help of the load-stone, as it were, epitomise all the experiments of gravity, and determine, to what distance the gravitating power of the earth acts; and explicate perhaps divers other phenomena of nature by ways not yet thought of."

The description of the instrument is as follows,

AB a frame, to which is fastened CD a spring, from the end of which C a thread CE is fastened to a small wheel FF, which moves on a very sharp edge, in the hole m. To the other side of this wheel is fastened a small long beam HH, reaching beyond the frame AB, namely to N, to which end a weight of a convenient bigness I being hung, and the instrument carefully conveyed from place to place, the end of the beam will shew upon the divided pillar KK the differing weight of that body in several places.

It was ordered, that experiments of this kind should be prepared for the next meeting; in order to which Sir ROBERT MORAY was desired to accommodate the curator with his Majesty's load-stone, being in his custody.

Sir ROBERT MORAY produced the two pieces of lead, mentioned at the preceding meeting, extracted by him out of litharge of gold and silver; which he said he intended to carry to the Tower to make essays upon.

Mr. EVELYN presented some ashes rained down far off at sea, in the Archipelago in December of the year 1631, at ten at night, continuing to fall till two the next morning, which covered the deck of a ship a foot deep, totally darkened the air, and caused all the mariners to abandon the decks for fear of being suffocated.

He brought in likewise 45 sorts of moss, which he said were gathered in one wood in Surrey, upon several trees.

Dr. WILKINS moved, that Mr. HOWARD being furnished with various flowers of a strawy consistence, might be desired to increase the society's repository with them.

He moved likewise, that a committee might be appointed to take care of the well ordering, preserving, and increasing the stock of the said repository. Upon which it was ordered, that himself, Mr. COLWALL, Mr. EVELYN, Dr. GODDARD, Dr. CHARLTON, Mr. HILL, Capt. COCK, Mr. HARRINGTON, Mr. GRAUNT, and Mr. HOOKE, or any three or more of them, should constitute that committee, and begin their meetings on the Monday following in the afternoon, in Mr. HOOKE's lodgings, continuing the same from time to time on that day, and in that place.

Mr. COLWALL had the public thanks of the society for the generous purchase, which he had made for them, of so good a collection of natural things for their repository; and it was ordered, that this gift should be particularly expressed, where he is recorded a benefactor to the society.

Mr. HOOKE related, that in the salt-urns in Hampshire he had observed, that a good quantity of sand, near a gallon, was separated from the clear sea-water in the boiling it up to salt; which sand was collected out of the corners of the iron-vessel, wherein the said water was boiled.

Sir ROBERT MORAY was again urged to give in his history of masonry, which he still declined to do, alledging it to be incomplete.

Mr. HENSHAW mentioned, that the Italians thought they had retrieved the ancient way of hardening tools for the cutting of porphyry; and that it was by quenching them several times in the distilled water of *Branca Urfina*, or bear's-breech.

Dr. CHARLTON remarked, that that way of hardening tools, which is commonly called case-hardening, was performed with hoofs, foot, and bay-salt, put together with the iron in a case, and kept with it hot in the fire.

Dr. WREN and Mr. HOOKE being asked, what they had done in the business of chariots, since the perfecting thereof was committed to them, Dr. WREN answered, that he had given Mr. HOOKE the descriptions of those, which they had in France.

1666, *March* 23, Mr. HARRINGTON was admitted.

It was voted by ballot, that the election of the new council and officers for the remaining part of the year be upon April the 11th following, since the anniversary election of that year could not, by reason of the contagion, be made on St. ANDREW'S day preceding. There were present at this meeting one and thirty fellows, as the charter required for such an occasion, viz.

The lord viscount Brouncker, presid^t

Mr. AERSKINE
The lord CAVENDISH
Dr. CLARKE
Mr. COLWALL
Mr. DANIEL COXE
Mr. CREED
Sir GEORGE ENT
Mr. EVELYN
Lord bishop of Exeter
Dr. GODDARD
Mr. GRAUNT
Mr. HARRINGTON
Mr. HOOKE
Mr. HENSHAW

Sir ANDREW KING
Dr. MERRET
Sir ROBERT MORAY
Sir ANTHONY MOROAN
Sir PAUL NEILE
Mr. WILLIAM NEILE
Mr. OLDENEURG
Mr. PALMER
Mr. PONEY
Dr. QUARTREMAINE
Sir JOHN TALBOT
Dr. WHISTLER
Dr. WILKINS
Mr. WILLIAMSON
Dr. TERNE.

Mr. HOOKE presented a paper containing some observations made by himself of the planet Mars, in the face whereof he affirm'd to have discovered, during the last months of February and March, both that there were several spots, and that they changed their place, and did not return to the same position till the next ensuing night near about the same time; collecting thence, that Mars, as well as Jupiter, the earth, &c. moves about his own axis in about 24 hours. To which he added his observations concerning the different dispositions of the air, as to its greater or less fitness to see through it, affirming, that frequently a very bright sky was altogether unfit for observation; but that when it had fewer reflecting vapours dispersed through it, it was then most transparent, and consequently most proper for it.

* Dr. WREN had been in that country in the summer of the year 1665, and returned from thence about the end of February or beginning of March 1667. See BOYLE'S works, vol. v. p. 333 and 351.

Whereupon the president took notice (in which his lordship was seconded by Dr. WILKINS) that Sir PAUL NEILE had already some years before observed the like difference in the air; and that sometimes in a very bright sky he could see nothing distinctly in the celestial bodies, but at other times, the sky being serene after a good shower of rain, that had swept down a great quantity of terrestrial effluvia mingled with the air, and hindering the free passage of the starry beams, he could see those bodies very distinctly.

Mr. HOOKE was desired to continue his observations for farther confirmation; and it was order'd, that his paper should be register'd^a.

He produced a pair of scales in a box, to make experiments with upon a good loadstone for the finding out of the decrease of its attractive force upon a body, according as it is placed at greater and greater distances, in order to find out, whether gravitation be somewhat magnetical; which he said might be done by comparing the distances of the bodies made use of in the experiments from the superficies of the earth and loadstone with the diameters; it being probable, that if they hold the same proportion, they have the same cause.

It was ordered, that he should make in it several experiments by himself, and then make them before the society.

Mr. OLDENBURG presented from Mr. GREEN, who had lived many years in Virginia, and had also been in Carolina, several plants of the growth of those parts, viz. 1. The wild penny-royal, or bastard dittany, said to kill the rattle-snake, and cure those who are bitten by it. 2. Both the *pistolechia's*, the major and minor, esteemed to be very good cordials, and remedies against the bite of serpents. 3. The true Virginia *scorzonera* root, used by the inhabitants of Virginia for fevers and agues. 4. The *saba Aegyptiaca*, the leaf of which is affirm'd to be as large as the brim of a large hat, the flower glorious, of a yellow colour, three times as big as an ordinary tulip, growing in rivers and other waters of Carolina in the mud at a man's depth; the root of it being much used by the Indians, and eaten as a restorative; and the beans toasted by them, and eaten against fluxes.

There was read a letter sent to Sir ROBERT MORAY out of Virginia, by a countryman of his, dated from Ware-river in Mochjack-bay, Feb. 1, 1665, containing several particulars, about a new way of ordering mulberry-trees, and the progress of the silk manufacture there; as also of a probability of making rice and coffee merchantable commodities of Virginia, and of improving a new sort of sweet-scented tobacco.

Sir ROBERT MORAY was desired to exhort his friend to prosecute what he had begun, and to impart the farther success thereof to the society, who ordered, that a copy should be made of this letter, and filed up^a.

^a Register, vol. 3. p. 98. It is printed in the *Philosophical Transactions*, n° 2. p. 158, and n° 14 p. 239.

^b Letter-Book, vol. i. p. 211. It is printed in the *Philosophical Transactions*, n° 12. p. 201. for May, 1656.

The usefulness of collecting observations of the plague being again spoken of, it was moved, that the physicians of the society would employ themselves in the work; and that Dr. GLISSON and Dr. WHARTON, and such others as had staid in London during the late mortality, might be desired to communicate what particulars they had either observed themselves, or learned from others, about this disease. Dr. TERNE promised, that he would solicit Dr. GLISSON for it; and Dr. MERRET related, that he had been inform'd by Dr. HODGES[†], one of the city physicians during the plague, that the true pestilential spots, called the tokens, were a gangrenated flesh of a pyramidal figure, penetrating to the very bone, with its basis downward, altogether mortified and insensible, tho' a pin or any other sharp body were thrust into it; and (what the Doctor thought particularly remarkable) the next adjoining parts of the flesh, tho' not discoloured, yet mortified as well as the discoloured ones.

There were produced by Mr. OLDENBURG a couple of bottoms of the Virginia silk-worm, sent in by Mr. DIGGES for the repository, of the bigness of a small hen's egg; which being cut open, there were found four worms in each, supposed to have set themselves near together at the time of spinning, and so to have spun themselves all four into one cod.

Mr. POVEY offered some curiosities of silk-worms for the repository.

Mr. BOYLE's treatise on the *Origin of Forms and Qualities, according to the Corpuscular Philosophy, illustrated by Considerations and Experiments, written formerly by way of notes upon an essay about Nitre*^{*}, was presented to the society, who recommended the perusal of it to Dr. WILKINS.

March 29, at the meeting of the COUNCIL were present

The lord viscount BOUNCKER, presid^t
The lord bishop of Exeter
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE
Mr. HENSHAW

Mr. PALMER
Dr. WILKINS
Dr. GODDARD
Mr. COLWALL
Mr. OLDENBURG.

Dr. WILKINS having made a report, that the lord chancellor had appointed the Saturday following for a meeting of the committee of the lords referees about Chelsea-college to be at his house about ten of the clock, it was ordered, the president, the lord bishop Exeter, Sir ROBERT MORAY, Sir PAUL NEILE, Dr. WILKINS, Dr. GODDARD, Mr. PALMER, Mr. HENSHAW, Mr. COLWALL, and Mr. OLDENBURG should be desired to attend the said committee; and that Sir ANTHONY MORGAN should be desired to be likewise present.

[†] NATHANIEL HODGES, M. D. author of *AIMMOAOTI A, five pestis superæ apud populum Londonensem grassantis narratio historica*. London 1672, in 8vo.

^{*} printed at Oxford 1665, in 4to. and reprinted the year following in 8vo.

Sir PAUL NEILE was desired to speak the next day at Whitehall to the archbishop of Canterbury^a, the bishop of London^b, the lord privy seal^c, and the lord ASHLEY, to meet at the lord chancellor's on the day appointed; and in case the lord privy-seal should not be at Whitehall the next day, Sir ROBERT MORAY was desired to write to him about this meeting.

The list of the fellows of the society was perfected, and ordered to be printed against the Wednesday following.

It was ordered, that particular written summons be sent to the princes of the blood, and to as many of the lords of the society as were in town, in the form following:

" On Wednesday the 11th of this instant April, 1666, at two of the clock in the afternoon, the president, council, and officers of the Royal Society for the remaining part of this present year, are to be elected at the usual place in Gretham-college."

It was ordered likewise, that the following form be printed and sent to the fellows for this extraordinary day:

" Whereas the usual time for the annual election could not be observed this last year by reason of the sickness; these are to give notice, that the Royal Society, according to the power given to them by charter, have appointed the 11th day of April, 1666, being Wednesday, for the election of the council and officers of the Royal Society for the remaining part of this year: at which election your presence is expected at two of the clock in the afternoon, at the usual place."

It was order'd, that number eleven of the *Philosophical Transactions* be printed.

April 4, at the meeting of the SOCIETY

Capt. COCK was admitted.

There were nominated by the president, and chosen by ballot, the following persons, as a committee for auditing the treasurer's accounts; Dr. CHARLTON, Capt. COCK, Mr. NEILE, Mr. HAAK, and Mr. HOOKE; and they were desired to meet on the Monday following at Mr. HOOKE's chambers in Gretham-college.

Mr. HOOKE presented a table of the degrees of the loadstone's attraction of a little square oblong piece of iron at several distances from the pole of the magnet, as he had found it in making trials privately himself, viz.

			grains
at 6 inches	—	—	o
at 4 inches	—	—	o $\frac{1}{2}$
^a Dr. SHELDON.	^b Dr. HUMPHREY HENCHMAN.	^c Lord ROBERTES.	at
2			

			grains
at 2 inches	—	—	2 $\frac{1}{2}$
at 1 inch	—	—	17 $\frac{1}{2}$
at $\frac{1}{2}$ of an inch	—	—	57 $\frac{1}{2}$
at $\frac{1}{4}$ of an inch	—	—	104 $\frac{1}{2}$
at $\frac{1}{8}$ of an inch	—	—	197 $\frac{1}{2}$

Which trials being repeated before the society held good, except, that instead of the 2 $\frac{1}{2}$ grains at 2 inches distance, the weight was 3 $\frac{1}{2}$ grains; and instead of 17 $\frac{1}{2}$ grains at 1 inch distance, the weight was 18 $\frac{1}{2}$ grains, to equal the attraction.

A thin plate of steel being interposed at about an inch distance made the weight less by 14 grains.

Sir ROBERT MORAY mov'd, that the several ways of capping of loadstones might be considered, to see, whether it could be reduced to a rule.

It was order'd, that Mr. BALLE should be written to by Mr. OLDENBURG, to know what he had done in magnetical experiments, and that he should be desired withal to send up the magnetic apparatus, that was with him, belonging to the society, who had present occasion for it.

Mr. PALMER presented the society for the repository with a case of curious turn'd Nurenburg cups of wood, to the number of ninety-five.

Capt. COCK was desired to inform himself by some Turkey or East-India merchants of the way used by them for the unhusking of rice.

Mr. DANIEL COXE desir'd, that some rusina might be sent for out of Italy.

April 9, at the meeting of the COUNCIL were present

The lord viscount Brouncker, presid^t
 The lord bishop of Exeter
 Sir ROBERT MORAY
 Sir PAUL NEILE
 Mr. AERSKINE
 Dr. WILKINS

Dr. GODDARD
 Mr. HILL
 Mr. COLWALL
 Mr. GRAUNT
 Mr. OLDENBURG.

A committee of the council was appointed to examine the treasurer's accounts, and to prepare them for the committee of the society, according to statute, viz. the president, Dr. WILKINS, Mr. COLWALL, Mr. GRAUNT, and Mr. OLDENBURG.

This committee of the council having examined the accounts, and after rectification of some mistake in the transcript thereof made a report to the council, which was accepted, the council referred the said accounts to the committee of the society appointed for auditing the same.

Sir

Sir ANTHONY MORGAN brought in from the lord chancellor the report concerning Chelsea-college, in order that it might be read by the council, before it was signed by his lordship and the other lords referees. And the council having read it, it was ordered, that the president, Sir ROBT MORAY, and Sir PAUL NEILE, should be desired to return the lord chancellor their humble thanks for his lordship's favour in giving them a view of this report before signing; and that the lord bishop of Exeter should be desired to deliver the report to the lord archbishop of Canterbury and to the bishop of London to be signed by them; and that then it should be sent by the care of Sir ANTHONY MORGAN to Mr. MATTHEW WREN to be signed also by the lord chancellor.

In the mean while Sir ANTHONY MORGAN was desired to speak with the attorney-general, and to enquire, whether there be not a mistake in his report, as to the house of Chelsea-college.

April 11, the society being met for the election of a new council and officers, according to what was resolved March 28, there was first a report brought in of the treasurer's accounts by the committee chosen at the preceding meeting for the auditing them, viz.

That by the audit of Mr. HILL's account it appear'd, that he was debtor

	<i>l.</i>	<i>s.</i>	<i>d.</i>
To the arrears due to the society for the weekly payments to and for } Lady-day, 1666	875	3	0
To money received for admissions	39	8	0
To money received of Sir PAUL NEILE more than his ordinary payments }	3	0	0
To the balance of his last account	51	1	4
	968	12	4

It appeared,

That the treasurer had received upon the weekly payments of the } society	196	18	0
For admission-money	39	8	0
Of Sir PAUL NEILE more than his ordinary payments	3	0	0
And the balance of his last account	51	1	4
	290	7	4
	That		

That he was creditor

By the money paid to the use of the society, as by the bills appeared	_____	_____	_____	_____	256	4	8
By arrears remaining yet unpaid	_____	_____	_____	_____	678	5	0
By balance remaining in cash	_____	_____	_____	_____	34	2	8
					968	12	4

Remaining in cash thirty-four pounds, two shillings, and eight-pence,
signed Brounker, P. R. S.

It also appeared,

That the treasurer had paid to the use of the society several bills amounting to	_____	_____	_____	_____	256	4	8
That he had now in his hands	_____	_____	_____	_____	34	2	8

And that there remained in arrear, yet unpaid by the members of the society, six hundred, seventy-eight pounds, five shillings.

Signed

WILLIAM NEILE
THEODORE HAAK

WALTER CHARLTON
GEORGE COCK
ROBERT HOOKE.

This being done, the society being forty-six in number proceeded to election, according to the manner prescribed by their statutes.

Of the old council were continued the following eleven,

WILLIAM, lord viscount Brounker	JONATHAN GODDARD M. D.
SETH, lord bishop of Exeter	DUDLEY PALMER, esq;
WILLIAM AERSKINE, esq;	ABRAHAM HILL, esq;
Sir ROBERT MORAY, knt.	DANIEL COLWALL, esq;
Sir PAUL NEILE, knt.	HENRY OLDENBURG, esq;
JOHN WILKINS, D. D. dean of Rippon	

The ten new ones chosen in, were these

JAMES, earl of Northampton	DANIEL WHISTLER, M. D.
WILLIAM, lord viscount STAFFORD	MATTHEW WREN, esq;
ROBERT BOYLE, esq;	JOSEPH WILLIAMSON, esq;
Sir ANTHONY MORGAN, knt.	WILLIAM NEILE, esq;
Sir GEORGE ENT, knt.	JOHN CREED, esq;

Out

Out of the new council were elected officers.

The lord viscount Brouncker,	president
Mr. Colwall	- - - - - treasurer
Dr. Wilkins	} - - - secretaries.
Mr. Oldenburg	

The new counsellors were then sworn, except the earl of Northampton, the lord viscount Stafford, and Sir George Ent, being all three absent.

After this Sir Robert Moray presented the society with the stones taken out of the lord Belcarres's heart, in a silver box, together with a written account of the dissection of his body, attested by a physician and chirurgion in Scotland, with this condition only, that in case the lady Belcarres, the deceased lord's mother, should fend for it, it might not be denied her.

Between this and the former election on the 30th of November, 1664, died an eminent member of the society, Sir Kenelm Digby. He was son and heir of Sir Everard Digby of Drytke in the county of Rutland, kn't. executed at the age of twenty-four, for being privy to the gun-powder-plot in 1605; whose estate was afterwards restored to his son Kenelm, who was born at Gothurst, commonly called Gadhurst, in Buckinghamshire, 11 July 1603¹.

Though his father lived and died a zealot for the church of Rome, this son of his, who was an infant at his death, was educated in the protestant religion, but he afterwards abandoned it for that of Rome. About the year 1618, he was sent to Gloucester-hall in the University of Oxford, and entered a gentleman commoner of it, and committed to the care of the learned Mr. Thomas Allen, but to the tuition of another person. After continuing there above two years, he travelled into foreign parts, and upon his return received the honour of knighthood from King James I. at Henchingbrook 28 October, 1623.

In 1628, he was appointed by King Charles I. admiral of a fleet sent to the Levant, in which post he acquired great honour by his gallant behaviour at Algier, in rescuing many English slaves, and by his attack upon the Venetian fleet in the Bay of Scanderoon². After he had embraced the Roman catholic religion, which was in the beginning of 1636, he became warmly attached to it, as appears from the letters, which passed between him and George lord Digby, in the years 1638 and 1639, published at London in 1651, in 8vo. In 1639, he was employed with Mr. Walter Montagu by the Queen to procure contributions from the papists for raising troops for the King against the Scots³. Upon the breaking out of the civil wars, he exerted himself with vigour for the Royal Cause; for which reason he was imprisoned by the Long Parliament in Winchester-House, till July 1643, when at the request of the French Queen he obtained leave to go to France⁴.

¹ Wood, Athen. Oxon. vol. ii. col. 351. Ben Jonson in his *Underwoods*, p. 243, makes Sir Kenelm's birth day 11 June.

² Wood, *ubi supra*.

³ Whitelocke's Memorials, p. 32. edit. 1732.

⁴ Wood, col. 352.

In 1645, he was sent by Queen Henrietta, wife of Charles I. to the Pope, in order to procure assistance for that King^p; soon after whose death he returned to England^q; and was suffered by the parliament to compound for his estate, but upon condition of departing the commonwealth, and not returning without leave of the house, under pain of death and confiscation of his estate^r.

BUT after OLIVER CROMWELL became protector, he came back to England, and was in considerable favour with the protector in the beginning of the year 1654^s, and upon his return to France, corresponded with secretary THURLOE, to whom he wrote a letter on the 4th of December 1655, N. S. in favour of the merchants trading to England^t; and another dated there March 18, 1656^u; complaining that Sir ROBERT WELSH had endeavoured to render him suspected to the protector, to whom his own obligations had been so great, that it would be a crime in him to behave himself so negligently, as to give any cause for any shadow of the least suspicion, or to do any thing, that might require an excuse or apology. "I make it, *adds he*, my business every where, to have all the world take notice, how highly I esteem myself obliged to his highness, and how passionate I am for his service and for his honor and interests, even to the exposing of my life for them." After the Restoration of King CHARLES II. he returned to England, and was one of the earliest members chosen into the Royal Society, and nominated of it's council in the first charter. He had been long chancellor to the Queen-mother; which office he held till his death, at his house in Covent-Garden the 11th of June, 1665, being interred in a vault in Christ-church near Newgate, where he had erected a monument to his wife VENETIA, daughter and co-heir of Sir EDWARD STANLEY, destroyed in 1666, by the fire of London. His abilities and learning were very considerable, but his character as a philosopher much lessened by his credulity or want of veracity. His writings are,

A Conference with a Lady about the Choice of Religion: Paris, 1638, in 8vo.

Observations upon Dr. THOMAS BROWN's Religio Medici: London, 1643, in 8vo.

A Treatise on the Nature of Bodies: Paris, 1644, in fol.

A Treatise of the Nature of Man's Soul: Paris, 1644, in fol.

Observations on the 22d Stanza in the ninth Canto of the second Book of SPENSER's Fairy Queen: London, 1644, in 8vo.

Institutum peripateticarum Libri quinque, cum appendice theologicæ de Origine Mundi: Paris, 1651, fol.

^p Letter of lord JARMYN to lord DUNBY, Aug. 5, 1642, printed in HUSBAND's Collection, p. 822; and Inquiry into the same, which King CHARLES I. had in the translations of the earl of Glamorgan, p. 46, 52, 53, 137, 143, and 232, edit. 1747.

^q CARLE's collection of original letters, vol. i. p. 210, 210.

^r WOOD ed. 332.

^s BOYLE's works, vol. v. p. 263.

^t THURLOE's state papers, vol. iv. p. 244.

^u Ibid. p. 591, 592.

Letters to the lord GEORGE DIGBY concerning Religion: London, 1651, in 8vo.

Of the Cure of Wounds by the Powder of Sympathy: London, 1658, in 8vo, delivered in French in a solemn assembly at Montpellier in France, and translated into English by RICHARD WHITE.

A Discourse concerning the vegetation of Plants: delivered at the Royal Society 23 January, 1667. London, 1667, in 8vo.

Some of his collections on physic, chemistry, &c. were published after his death by GEORGE HARTMAN, his steward and operator.

April 18. Mr. HOOKE produced a new kind of watch, the motion of which was regulated by a load-stone, the balance of it being a rod of steel; concerning which the president declared, that this way might do best of all, in case the magnet kept always the same temper.

The springy saddle contrived by Mr. HOOKE was tried, and an exception being made against the narrowness of the seat, and the way of hanging on the stirrups, it was ordered, that against the next meeting it should be made with a full seat, and with the stirrups hanging from the seat itself.

It was ordered, that Mr. BALLE be again written to, to send up the magnetical apparatus in his hands belonging to the society.

Dr. WILKINS moved, that Sir ANDREW KING, Capt. COCK, and Mr. HARRINGTON might be desired to procure out of Spain and the East country as many good load-stones, as they could, for the use of the society.

Mr. BOYLE was called upon for the experiments of sounds, made at Oxford the preceding summer by some of the members of the society, and said by Dr. WALLIS to have been put in writing by him: to which he answered, that they were not perfect.

He being desired to inform the society, what success he had had in the experiment of transfusing blood out of one animal into another, declared, that he had found so much, as made him hope, that the difficulties, which to some appeared therein, might be surmounted; and that he thought, that the experiment, which he had made of it, would have proved a good one, if the syphon had not broke.

Dr. CHARLTON observed, that if the fluidity and life of the blood depended upon the ferment vitality with or in the vessels, which ceased presently upon its being extravasated, the experiment would prove useless: But that if the course and vigour of the blood was impaired only by the external air, that might easily be prevented.

Mr. BOYLE being desired to prosecute this experiment, declared, that he thought Dr. LOWER would do so at Oxford.

He related, that being once desirous to try, whether a dog might be fed by injection, he injected some quantity of broth into the jugular vein; but that this dog soon after died, and being opened, the broth was found in the right ventricle of his heart. He observed therefore, that it would be better to try by injecting broth into the crural vein, as being at a greater distance from the heart.

Dr. CHARLTON mentioned, that purges given by injection had no effect; but vomits had, and that quickly.

Mr. BOYLE added, that opiates given this way operated likewise presently; which Dr. CHARLTON confirmed.

Mr. OLDENBURG presented the society with a curious piece of turning made in Germany, viz. a solid ivory triangle, with many thin circles, and several parts of the shape of lillies; all turned out of one piece, and contained in a small ivory ball.

Mr. POVEY mentioned a new way of painting used by one Mr. STREETER, by means whereof he affirmed a picture appeared very well without glaring, though hung directly opposite to the light; which was performed by beating an egg yolk and white into a glass, and stirring it with a rod, or the juice, or the shreds of a branch of a fig-tree, and so mingling it with the several colours.

He offering to go with Mr. HOOKE to the artist, to see the operation itself, his offer was accepted, and Mr. HOOKE ordered to attend him accordingly.

He presented a skeleton to the society.

April 23. the new COUNCIL met the first time, there being present

The lord viscount Brouncker, president	
The lord viscount STAFFORD	Dr. WHISTLER
Sir ROBERT MORAY	Mr. COLWALL
Sir PAUL NEILE	Mr. HILL
Sir ANTHONY MORGAN	Mr. WILLIAMSON
Sir GEORGE ENT	Mr. NEILE
Mr. AERSKINE	Mr. CREED
Dr. WILKINS	Mr. OLDENBURG.
Dr. GODDARD	

Sir GEORGE ENT was sworn of the council.

Mr. COLWALL was sworn as treasurer of the society.

It was ordered, that Mr. HILL do pay to Mr. COLWALL, the present treasurer, the remainder of the account in his hands; viz. thirty-four pounds, two shillings, and eight pence.

Mr.

Mr. COLWALL suggesting to the council, that a person might be taken into the society's service for collecting their arrears, he was empowered to employ such person, as he should think fit for that purpose, taking security of him, and so rewarding him, that the reward might not exceed one shilling in the pound.

Sir ROBERT MORAY mentioned, that the lord MASSARENE had formerly by a letter desired Mr. BOYLE and himself, that they would engage themselves for one hundred pounds, which he gave to the use of the society. Which letter being in the president's hands, his lordship was desired to bring it with him to the next meeting of the council.

An expedient for bringing in the arrears of the society being considered of, it was thought good, that those members, who were frequently present at the meetings of the council and society, should be desired to speak to their acquaintance, and to urge payment.

Sir ANTHONY MORGAN mentioned, that the lord bishop of London not having got signed the report of the lords referees concerning Chelsea-College, it had not yet been presented to the King; and that the attorney-general had declared, that his Majesty granting only what right he had to Chelsea-College, Mr. COLE could not at all be prejudiced by that grant.

April 25. Mr. OLDENBURG was desired to write to Sir JOHN FINCH, to request him, that he would procure for the society some good load-stones in Italy, and especially out of the island of Elva: As also, that he would communicate the observations made upon the famous magnet in the palace of the great duke at Florence; and particularly inform the society, what weight it was able to hold? whether it could raise a man from the ground by holding an iron so fast, that one may hang on it? whether it had changed its poles, as some reported? &c.

Mr. HOOKE shewed by a terrella, that the lines of a load-stone's direction are all ovals, of which the center of the magnetic globe is the place of contact, and the axis of them perpendicular to the axis of the terrella. This was performed by suspending and letting freely move a needle upon a small triangular piece of wood, and marking the points of it with respect to the magnet; all which fell into an oval.

He offered his thoughts of an hypothesis, for explicating all the phenomena of a load-stone; which he was desired to give in to the next meeting.

He affirmed, that he had put all sorts of bodies between a magnet and iron, and that none altered the attraction except iron.

Mr. BOYLE proposed, that in order to examine both the Epicurean and Cartesian hypothesis concerning the cause of the coition of the load-stone and iron, viz the dispelling of the air by the efflux of the *particule striate*, an experiment might be made of it in an exhausted receiver.

Dr.

Dr. GODDARD proposed, that this experiment, whether the attraction depends upon the air, might be tried by putting a magnet and iron both in water in a glass: which was ordered to be done at the next meeting.

The directive virtue of the load-stone was tried by putting a magnetic needle under water, where the needle kept the like posture upon the approach of a load-stone, that it does in the air.

Dr. WILKINS moved, that the experiment described by Mr. BOYLE in his book concerning *the origin of forms* of changing water into earth, almost weight for weight, might be tried by some members of the society; and Mr. DANIEL COXE was desired to undertake it, and to try some in glass, and some in metalline vessels.

May 2. The experiment of the load-stone's attraction in water was tried; and it was found, that the load-stone and the iron-ball touching one another under water, held 128 grains before they were separated. And the water being drawn off from the load-stone, and the load-stone dried, the two bodies held near the same weight before separation; so that the magnet seems to be as powerful in the very water, as in the air.

Dr. GODDARD moved, that it might be tried, whether the magnet will attract at the same distance in the water, as in the air.

Sir PAUL NEILE produced a piece of a mineral brought out of Guinea, taken from a rock, which had an aluminous taste. It was delivered to Mr. DANIEL COXE to dissolve it, and then to give the society an account of what he found in it.

Sir ROBERT MORAY mentioned, that Sir HUGH CHOLMONDELEY had promised him the whole process of making alum. He was desired to get that promise effected.

Some experiments were made with two load-stones, one a terrella, the other of an irregular figure. Some steel-dust being scattered about them, there appeared upon the different position of the latter in respect of the former different and odd postures in the steel-dust.

Mr. HOOKE was ordered to describe these postures in schemes, and to bring them in to the society.

Mr. POWLE brought in the history of iron; or an account of the manner of its preparation in the forest of Dean. Which was read, and ordered to be registered*.

* Register, vol. iii. p. 106. It is printed in the Philos. Transact. vol. xii. n° 137, p. 931, for January and February 1674.

The experiments appointed for the next meeting were the chariot, and the prosecution of the magnetical experiments.

May 9. At the meeting of the COUNCIL were present

The President

Mr. BOYLE
Sir ROBERT MORAY
Sir ANTHONY MORGAN
Mr. AERSKINE
Sir GEORGE ENT
Dr. WILKINS

Dr. GODDARD
Dr. WHISTLER
Mr. COLWALL
Mr. CREED
Mr. NEILE
Mr. OLDENBURG.

It was ordered, that the president be desired to write a letter to those of the nobility, who were members, concerning their arrears, to this purpose, viz. that the occasions of the society requiring a present supply of money, they were desired to give order for the immediate payment of their respective arrears to the treasurer, or to whom he shall appoint to wait upon them for it.

It was ordered likewise, that the treasurer write to the rest of the society to the like purpose.

Sir ANTHONY MORGAN was desired to get the papers concerning Chelsea-College, and to send them to the president, that, together with them, the report of the lords referees might be by his lordship presented to his Majesty.

At the meeting of the SOCIETY on the same day,

JOHN COPLESTONE, esq; was elected.

JOHN lord YESTER was proposed candidate by Sir ROBERT MORAY.

Monsieur ADRIAN AUZOUT of Paris was proposed candidate by Mr. OLDENBURG.

THOMAS CRISPE, esq; was proposed candidate by Mr. COLWALL.

Mr. HOWARD gave in a relation from his brother Mr. HENRY HOWARD, at Vienna, wherein the emperor's historiographer PETER LAMBECIUS, J. U. D. desired to correspond with the society, and offered to contribute what he could to their design.

Mr. HOWARD likewise presented a book of LAMBECIUS, containing an account of the emperor's library, its beginning, increase, and present state, consisting of about eighty thousand books, manuscript and printed; part of which consisted of several libraries, as that of TYCHO BRAHE, KEPLER, MÆSTLINUS, and the relics of the Royal Hungarian library of Buda, &c. containing likewise near sixteen thousand medals,

medals, and a collection of curiosities both of nature and art. Mention is also made by Dr. LAMBECIUS of a book of his intitled *Historia Literaria*, undertaking to give an account of the rise, progress, fall, and restoration of languages, sciences and arts, from the beginning of the world to that age; as also of the men famous for the increasing and promoting of knowledge, viz. when and where they lived, and what they wrote and contributed to learning.

Mr. OLDENBURG was desired to write two letters, one to Mr. HENRY HOWARD, giving him the society's thanks for taking into consideration their concerns even whilst he was abroad; the other to Dr. LAMBECIUS, expressing the kind reception of his offers by the society.

Mr. HOWARD was particularly desired to write to his brother about the mummy for the society's repository.

Mr. OLDENBURG produced a discourse written by Dr. WALLIS concerning his hypothesis for solving all the phenomena of the flux and reflux of the sea, upon the consideration of a common center of gravity of the earth and moon. The amanuensis was ordered to write a fair copy of this discourse, and to make the schemes contained in it large, against the next meeting.

Mr. OLDENBURG read a letter to himself from Monsieur AUZOUT, dated at Paris 5 May, 1666, N. S. * giving an account of EUSTACHIO DE DIVINIS's pretence, that the permanent spots in JUPITER had been first discovered by his glasses, though that was nothing but a pretence. To which Monsieur AUZOUT adds an account of the contest between EUSTACHIO and CAMPANI about optic glasses; with a relation first of two rain-bows intersecting each other almost at right angles; next of four suns lately seen in France about Chartres in three circles, a small one concentric to the true sun, a larger one passing through the disk of the true sun, and having one of the parhelia almost diametrically opposite to the sun; another circle excentric to the sun, in whose two intersections with the biggest circle the two other parhelia appeared.

Two magetical experiments were made by Mr. HOOKE. One was, that the terrella being so placed, as to have its poles perpendicular to the horizon, the steel-dust held over it in a sieve, and put into motion, was, instead of being attracted, chased away from both the poles in two several trials; and the same terrella being placed horizontally, and the steel-dust held again over it, it was likewise driven from both the poles at once. The same was tried with a magnet of an irregular figure with the like success. The other experiment was, that the terrella being put in the midst of a board in a hole, and the steel-dust ranged in oval figures about it, a small load-stone being placed on the same board, the dust, when put into motion, was determined by it into analogous oval figures; which seemed to shew how the load-stone conforms itself to the earth.

* Letter-Book, vol. i. p. 305. Part of this letter is printed in the Philos. Transact. n° 12, p. 209, for May 1666.

The business of chariots being again spoken of, the president related, that as Mr. Hooke's chariot was now contrived, it was better than before, and free from jolting.

Col. BLOUNT was desired to have his chariot brought to Gresham-college against the next meeting; which he promised to do.

Mr. HARRINGTON presented a piece of Japan copper, esteemed to be more brittle than Swedish copper.

Mr. BOYLE's general heads for making a natural history of a country, were read, and order'd to be register'd⁷.

May 16, a paper of Mr. PHILIPS was brought in by Mr. HOOKE concerning the variations of the magnetic needle, as they had been observed in two East-India voyages.

Mr. POWLE was desired to peruse this paper, and to give an account of the particulars contained therein.

Mr. OLDENBURG brought in a letter from Dr. WALLIS dated at Oxford, May 12, 1666, containing an account of an accident by thunder and lightning there; which was read, and order'd to be register'd⁸.

Dr. WALLIS's discourse concerning the ebbing and flowing of the sea was read, and generally approved of, and thought fit not only to be register'd⁹, but also upon the private perusal and examination of the president to be printed¹⁰.

It being, among other things, objected, first, that it appeared not, how two bodies, that have no tie, can have one common center of gravity, upon which the whole hypothesis of Dr. WALLIS is founded; and secondly, that contrary to his conjecture of the annual spring and neap-tides falling out, not about the æquinoxes, but the beginning of February and November, it was observed otherwise at Chatham and in the Thames; as also that at Bristol the highest annual tides happen about a month after the æquinoxes; it was desired, that Dr. WALLIS should be acquainted with these exceptions; and likewise, that as many members, as had opportunity, would henceforth make careful observations of this particular, both in the Thames, the Severne, and other maritime places.

An experiment was made to see, whether the magnet attracts iron at as great a distance in water as in the air; and it was found, that it did very near; for the loadstone and the iron being distant a little less than half an inch in both mediums, the counterpoise to the attraction of the iron by the loadstone in the water and air

⁷ Register, vol. iii. p. 119. They are printed in the Philos. Trans. n^o 11. p. 186. for April, 1666.

⁸ Register, vol. iii. p. 101. It is printed in Vol. II.

the Philos. Trans. n^o 13 p. 222. for June, 1666.

⁹ Register, vol. iii. p. 123.

¹⁰ It is published in the Philos. Trans. n^o 16. p.

264. for August, 1666.

was in a manner the same. But whereas the experiment was made first in the water, and then in the air, it was order'd, that at the next meeting it should be made first in the air and then in the water.

It being mentioned by Mr. HOOKE, that the motion of the celestial bodies might be represented by pendulums, it was order'd, that this should be shewed at the next meeting.

May 23, the lord YESTER, Monsr. AUZOUT*, and Mr. CRISPE were elected.

SAMUEL PARKER, M. A. was proposed candidate by Dr. WILKINS.

Dr. WHISTLER produced an odd insect, called Gryllotalpa, given him by Capt. WINGATE for the repository.

The president produced a letter and a note sent him by the earl of SANDWICH out of Spain, wherein his lordship offered himself to make observations for finding the bearing of Madrid from London, and desired a correspondent to observe the same times in England.

Mr. HOOKE in London and Dr. WALLIS at Oxford were fixed upon for that correspondency; and it was ordered, that the latter should be written to by Mr. OLDENBURG, to acquaint him with this appointment.

Mr. HOOKE proposed, that the distance of the moon's center from two or more fixt stars, when she is full south, as well as the other places mentioned by the earl of SANDWICH, might be observed.

He was order'd to take the paper of Mr. ROOKE, delivered by Sir ROBERT MORAY to Mr. OLDENBURG, containing some observations of the satellites of Jupiter, and to deduce thence the periods of their revolutions.

A paper of Mr. HOOKE concerning the inflection of a direct motion into a curve by a supervening attractive principle was read, and order'd to be registered*, and was as follows:

* He was elected *nemine contradicente*, as appears from a letter of Mr. OLDENBURG to Mr. BOYLE, dated at London, June 8, 1666, and printed in Mr. BOYLE's works, vol. v. p. 357. In this letter Mr. OLDENBURG observes likewise, that he found by his list from Paris, that "Monsr. AUZOUT was nominated for one of those choice persons, that are to constitute their academy; some of the rest, that are pitch'd upon, being M. ROBERVAL, M. CAUCAVI, M. FRENICLE, M. PICAART, M. HUYGENS, all very able men.—" I hope, adds Mr. OLDENBURG, our society

"will in time ferment all Europe at least, I wish only we had a little more zeal and a great deal more assistance to do our work thoroughly, as I am apt to believe the French will study to do theirs (they being like to be endowed) were it but out of emulation. So good be done to our generation, and a ground laid to do the like to posterity, no great matter what passions do concur for the performance."

⁴ Register, vol. iii. p. 114. See Mr. WALLIS's life of Dr. HOOKE, p. 12. prefixed to the posthumous works of Dr. HOOKE.

“ I have often wondered, why the planets should move about the sun according to COPERNICUS's supposition, being not included in any solid orbs (which the antients possibly for this reason might embrace) nor tied to it, as their center, by any visible strings; and neither depart from it beyond such a degree, nor yet move in a strait line, as all bodies, that have but one single impulse, ought to do: For a solid body, moved in a fluid, towards any part, (unless it be protruded aside by some near impulse, or be impeded in that motion by some other obviating body; or that the medium, through which it is moved, be supposed not equally penetrable every way) must perforce in its motion in a right line, and neither defect this way nor that way from it. But all the celestial bodies, being regular solid bodies, and moved in a fluid, and yet moved in circular or elliptical lines, and not strait, must have some other cause, besides the first impressed impulse, that must bend their motion into that curve. And for the performance of this effect I cannot imagine any other likely cause besides these two: The first may be from an unequal density of the medium, thro' which the planetary body is to be moved; that is, if we suppose that part of the medium, which is farthest from the center, or sun, to be more dense outward, than that which is more near, it will follow, that the direct motion will be always deflected inwards, by the easier yielding of the inward, and the greater resistance of the outward part of that medium. This hath some probabilities attending it; as, that if the æther be somewhat of the nature of the air, 'tis rational, that that part, which is nearer the sun, the fountain of heat, should be most rarefied; and consequently that those, which are most remote, should be most dense: But there are other improbabilities, that attend this supposition, which being nothing to my present purpose I shall omit.

“ But the second cause of inflecting a direct motion into a curve may be from an attractive property of the body placed in the center; whereby it continually endeavours to attract or draw it to itself. For if such a principle be supposed, all the phenomena of the planets seem possible to be explained by the common principle of mechanic motions; and possibly the prosecuting this speculation may give us a true hypothesis of their motion, and from some few observations, their motions may be so far brought to a certainty, that we may be able to calculate them to the greatest exactness and certainty, that can be desired.

“ This inflection of a direct motion into a curve by a supervening attractive principle I shall endeavour to explicate from some experiments with a pendulous body: not that I suppose the attraction of the sun to be exactly according to the same degrees, as they are in a pendulum: for in a circular pendulum the degrees of conatus at several distances from the perpendicular are in the same proportion with the sines of their arches of distance; as is evident by the figure.

Let A B represent a pendulum hanging perpendicular, suspended at A: if it be moved out of it, as to C or F, the conatus of the body to descend in the point C to the conatus in F shall be always as CD to FG. For it is a common principle of mechanics, that the conatus of a body descending in an inclining plane to that of one descending perpendicular, is in reciprocal proportion

tion to the length of those planes included between two horizontal parallel lines: As if there be a body at C, and another at D, the one descending by CE, the other by DE, the conatus in CE to that in DE shall be as DE to CE; that is as CA to CD. The same may be also proved of a ball at F and G, that the conatus of the body to descend in GH to that descending in FH, shall be as FH to GH; that is as AF to FG: Therefore the conatus in C to that in F, shall be as CD to FG; and consequently the conatus of returning to the center in a pendulum is greater and greater, according as it is farther and farther removed from the center, which seems to be otherwise in the attraction of the sun; as I may afterwards farther explain.

“ But however it be, the compounding this motion with a direct or strait motion just crossing it, may serve to explicate this hypothesis, tho’ all the appearances of it are not exactly the same As for instance, &c.

“ By this hypothesis, the phenomena of the comets as well as of the planets may be solved; and the motions of the secondary, as well as of the primary planets: The motions also of the progression of the auges are very evident. But as for the motion of libration or latitude, that cannot so well be made out by this way of pendulum; but by the motion of a wheel on a point is most easy.”

This discourse was an introduction to an experiment to shew, that circular motion is compounded of an endeavour by a direct motion by the tangent, and of another endeavour tending to the center. For which purpose there was a pendulum fastened to the roof of the room with a large wooden ball of lignum vitæ on the end of it. And it was found, that if the impetus of the endeavour by the tangent at the first setting out was stronger than the endeavour to the center, there was then generated an elliptical motion, whose longest diameter was parallel to the direct endeavour of the body in the first point of impulse. But if that impetus was weaker than the endeavour to the center, there was generated such an elliptical motion, whose shorter diameter was parallel to the direct endeavour of the body in the first point of impulse. And if they were both equal, there was made a perfect circular motion.

There was also made another experiment by fastening another small pendulous body by a shorter string on the lower part of the wire, which the greater was suspended by, that it might freely make a circular or elliptical motion round about the bigger, whilst the bigger moved circularly or elliptically about another center. The intention whereof was to explain the manner of the moon’s motion about the earth, it appearing evidently thereby, that neither the bigger ball, which represented the earth, nor the less, which represented the moon, were moved in so perfect a circle or ellipsis, as otherwise they would have moved in, if either of them had been suspended and moved singly; but that a certain point, which seemed to be the center of gravity of these two bodies, howsoever posited (considered as one) seemed to be regularly moved in such a circle or ellipsis, the two balls having other peculiar motions in small epicycles about the said point.

Mr. OLDENBURG produced a letter written to him by Dr. WALLIS from Oxford, May 19, 1666⁴, in answer to the objections made at the preceding meeting against his hypothesis of the tides: which letter giving occasion to renew the discourse upon that subject, Dr. GODDARD offer'd to the consideration of the society this doubt, viz. supposing the earth and moon to move about a compound center of gravity, if the highest tides be at new moon, when the earth is farthest from, and the moon nearest to the sun, and the tides abate as the earth approaches nearer, till she come into the supposed circle of her annual motion; why they do not abate, as the earth comes still nearer to the sun within the said circle? And so why we have not one spring-tide and one neap-tide in every course of the moon?

Others suggested, that in the East-Indies the highest and lowest tides were in the quadratures of the moon; as also that they happened in England not just at the full and change, but two or three days after.

The president desired the members to consider farther of Dr. WALLIS's hypothesis against the next meeting, and to bring in their thoughts accordingly.

Mr. HOOKE gave in his remarks upon Monsr. PETIT's dissertation of the nature of comets, which had been presented to the society some weeks before by the author, and referred to Mr. HOOKE's perusal; the substance of whose sentiments upon it were, that he found, that Monsr. PETIT's observations of the two last comets agreed in the general with those made by himself, and with the best, which he had met with of others: And that the hypotheses mentioned in that discourse were very ingenious, and some of them not improbable. But whether the comets were moved in equal spaces of a curve line in equal spaces of time (which Monsr. PETIT seemed inclin'd to believe) deserved to be farther examined by such observations, as had been made accurate enough to determine the distance or parallax of them in several places of their appearance.

Sir THEODORE DE VAUX produced some papers about coloration*. And it was ordered, that himself, Sir GEORGE ENT, Dr. GODDARD, Dr. QUATREMAINE, Dr. MERRET, Dr. WHISTLER, Dr. CLARKE, Dr. CHARLETON, and the rest of the physicians of the society, as also Mr. DANIEL COXE, Mr. HOOKE, and Mr. OLDENBURG, or any two or more of them, be a committee to consider of the said papers, and to cause them to be translated into English from the French, that so they might be the better digested afterwards. The time and place of the said committee's meeting to be at Sir GEORGE ENT's, on the Monday following in the afternoon.

Mr. COLWALL presented the head of a shark.

⁴ Letter-Book, vol. i. p. 320. It is printed in the Philos. Transact. n^o 16, p. 281—283, to the end of the 2d section.

* Drawn up by a very famous and curious phy-

scian from the mouth of the most knowing and experienced dyers of England and Holland in his time. See Mr. OLDENBURG's letter to Mr. BOYLE cited above.

Sir

Sir PAUL NEILE communicated a paper delivered to him by Sir GILBERT TALBOT, containing an account of a stone found in Sweden, yielding sulphur, vitriol, allum, and minium. It was ordered, that Sir GILBERT should be desired to procure a quantity of this stone from Sweden for a trial; and that the paper should be registered[†], as follows:

Sulphur. "There is a stone in Sweden of a yellow colour, intermixed with streaks of white, (as if composed of gold and silver) and heavy withal: it is found in firm rocks, and runneth in veins, upon which they lay wood, and set it on fire: when the stone is thus heated, they cast water upon it to make it rend; and then dig it up with mattocks. This done, they break it into smaller pieces, and put it into iron pots, of the shape in the margin, the mouth of the one going into the other. There they place the one in an oven upon an iron fork sloping, so that when the stone is melted, it may run into the other, which stands at the mouth of the oven, supported upon an iron. The first running of the stone is sulphur.

Vitriol. "The remainder of the burned stone is carried out, and laid upon a high hill, where it lieth exposed to the sun and air, for the space of two years; and then taketh fire of itself, casting forth a thin blue flame, scarce discernible in the day-time.

"This being consumed, leaveth a blue dust behind it, which the workmen observe, and mark with wooden pins. This they dig up and carry into the work-house, and put it into great tubs of water, where it infuseth twenty-four hours or more. The water they afterwards boil in kettles, as we do salt-petre, and put it into cooling-tubs, wherein they place cross sticks, and on them the vitriol fasteneth, as doth sugar-candid.

Allum. "The water, that remaineth after the extraction of the vitriol, they mix with an eighth part of urine, and the lees of wood-ashes, which is again boiled very strong, and being set to cool in tubs, cross-sticks are likewise placed, and thereon the allum fasteneth.

Minium. "In the water, which remaineth after the allum, there is found a sediment, which being separated from the water is put into an oven, and wood laid upon it and fired, till it become red, which maketh the minium, wherewith they paint their houses and make plaister."

Mr. DANIEL COXE mentioned, that there was an allum-stone in the north of England, yielding the same substances, except minium.

Mr. HOSKYNs produced a relation of the death of Mr. BROOKES, a justice of the peace in Hampshire, by lightning, written in a letter by THOMAS NEALE, esq; then high-sheriff of that county; which was ordered to be registered[†].

[†] Register, vol. iii. p. 118.

[†] Ibid. p. 117. It is printed in the Philos.

Transact. n^o 14, p. 247, for July 1665.

Col. BLOUNT and Mr. HOOKE were desired to appear on the Saturday following in the afternoon in St. George's Fields, with their new chariots, to compare them together; and it was requested, that as many of the society, as conveniently could, would meet them there.

It was ordered, that Mr. HOOKE should give an account of his experiments with the pendulum mentioned above in writing at large, together with the discourse, which he made upon them.

Dr. WILKINS proposing, that the balls might be so ordered, as to put some sand into them, which by running out might shew the lines of those motions, it was ordered to be done against the next meeting.

May 30. The president and vice-president being both absent, there could be no meeting of the society.

June 4. At the meeting of the COUNCIL were present

The President

Sir PAUL NEILE
Mr. AERKINE
Sir GEORGE ENT
Mr. PALMER
Dr. WILKINS
Dr. GODDARD

Dr. WHISTLER
Mr. MATTHEW WREN
Mr. COLWALL
Mr. NEILE
Mr. CREED
Mr. OLDENBURG.

Mr. MATTHEW WREN was sworn of the council.

Mr. PALMER was desired to consult with a lawyer about the following case,

"Whether the president appointing one deputy in his absence, and another in the absence of the said deputy, and so farther, these deputies be not one in law, and may be all sworn together, and act with intermission, as occasion serves, without being sworn anew; the form of the oath being as follows, *I A. B. do promise to deal faithfully and honestly in all things belonging to the trust committed to me as vice-president of the Royal Society of London for improving natural knowledge during my employment in that capacity.*"

It was ordered, that the clause, which contains the power of deputation, be transcribed by the amanuensis out of the charter, and shewed to the same lawyer, together with the recited case.

It was likewise ordered, that the secretary bring in a draught of a diploma for Monsieur AUZOUT:

That

That n^o 13 of the *Philosophical Transactions* be printed^b.

And that the committee of the mercers company be spoken to by Mr. HARRINGTON, Mr. COLWALL, and Mr. GRAUNT, for flooring the west gallery of Gresham-College; and that the form of the order be thus:

“ June 4, 1666.

“ At a meeting of the COUNCIL of the Royal Society.

“ Ordered,

“ That Mr. DANIEL COLWALL, Mr. WILLIAM HARRINGTON, and Mr. JOHN GRAUNT do wait upon the committee for the affairs of Gresham-College London, to desire, that they would please to repair the floor and windows in the west gallery of the said college, where the society's repository is to be.”

June 6. The society did not meet, it being the day appointed for fasting and humiliation on account of the late pestilence.

June 13. Mr. SAMUEL PARKER was elected and admitted.

Dr. WILKINS brought in for the repository three queen-bees, affirmed to be one third part longer than the ordinary ones, and a drone and a working-bee. Mr. HOOKE was desired to view in his microscope the queen-bees, to see what they had peculiar and different from other bees.

Sir THEODORE DE VAUX mentioning, that he had a written history of bees, was desired to produce it at the next meeting.

Dr. WILKINS produced a bone said to be taken out of the head of a whale, taken about the island of Bermudas. The person, from whom he received it, having offered his service to the society in making observations of the natural

^b The order for printing n^o 12, for May 1666, does not appear in the council book. At the end of that number is the following advertisement: “ Whereas it is taken notice of, that several persons persuade themselves, that these *Philosophical Transactions* are published by the Royal Society, notwithstanding many circumstances to be met with in the already published ones, that import the contrary; the writer thereof hath thought fit expressly here to declare, that that persuasion, if there be any such indeed, is a mere mistake; and that he, upon his private account (as a well-wisher to the advancement of useful knowledge, and a furtherer thereof by such communications, as he is capable to fur-

nish by that philosophical correspondence, which he entertains and hopes to enlarge) hath begun and continues both the compendium and publication thereof. Though he denies not but that having the honor and advantage of being a fellow of the said society, he inserts at times some of the particulars, that are presented to them; to wit, such as he knows he may mention without offending them, or transgressing their orders; tending only to administer occasion to others also to consider and carry them farther, or to observe or experiment the like, according as the nature of such things may require.”

things

things to be met with in that island, Mr. EVELYN was desired to draw up some inquiries to that purpose.

Mr. HOOKE brought in a petrefied fish called *Echinus Spaticus*, by which he conceived his notion of figured stones to be confirmed.

Mr. WILLUGHBY produced some both prepared and crude Bononian stone. The prepared would shine no more in the dark; the crude was offered to some of the members for preparation.

Mr. POWLE's account of Mr. PHILIP's paper concerning the needle in two East-India voyages was read, and ordered to be filed up together with that paper.

Mr. HOOKE exhibited a new contrivance of a circular pendulum applicable to a watch, and moving without any noise, and in continued and even motion without any jerks.

He was desired to shew the use of it in a watch, which he said the president had already given order for.

Sir GEORGE ENT brought in the translation of those papers communicated by Sir THEODORE DE VAUX about coloration, which had been committed to Sir GEORGE's care; and Sir THEODORE DE VAUX took them with him again, in order to compare them with the original book.

Sir THEODORE DE VAUX brought in some others translated by himself.

Mr. DANIEL COXE mentioning, that he had with success tried the experiment of changing gold into silver, was desired to shew it to the society at their next meeting.

The experiments appointed for the next meeting were

1. The prosecution of the magnetical ones.
2. The new watch with a circular pendulum.
3. The application of sand to the pendulum with two balls, shewing the motion of the earth and moon together.

JUNE 20. EDWARD NELTHROPE, esq; was proposed candidate by Dr. WILKINS.

The count of Traun of Austria with his retinue was present at this meeting.

Mr. OLDENBURG produced a printed paper in Latin, sent to him for the society by his correspondent at Paris from the Venetian ambassador Signor JUSTINIANI, containing the observations made in Italy by CASSINI, CAMPANI, DIVINI, and others,
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others, about the spots discovered by them in Mars, and the conversion of this planet about his own axis, confirming what had been discovered in England in February and March preceding by Mr. Hooke, who was desired to peruse this paper, and to give an account of it to the society at their next meeting.

Two letters of Dr. WALLIS, one dated at Oxford June 2, 1666¹, and the other June 8², were read, containing his answers to several objections made by some of the members at their late meeting of May 23, upon his hypothesis of tides. He being now come to London, and present at this meeting, and there farther declaring his thoughts by word of mouth concerning some particulars of this subject, received the public thanks of the society, who ordered, that he should be assisted for the farther evidencing of this subject, both with the relations contained in their register-books about the current of the tides in the open sea, and with astronomical observations, such as he had suggested in his letters above-mentioned.

Mr. Hooke mentioned, that he had observed a new spot in JUPITER different from those, which he had formerly observed in that planet, and in another belt. He added, that he had seen the satellites of Jupiter with Mr. Boyle's sixty-foot-glass as bright as he saw Jupiter himself with the naked eye.

He undertook to make observations of the parallax of the earth's orb to seconds; as also to make observations with long telescopes without the use of a tube.

It was ordered, that Mr. BOYLE, Sir PAUL NEILE, Sir ROBERT MORAY, Dr. WALLIS, Dr. GODDARD, Mr. WILLUGHBY, or any two or more of them, should be a committee to see to the execution of these undertakings; and it was desired, that as many more of the society, as conveniently could, would join with them therein.

Dr. WALLIS, upon the motion of Mr. BOYLE, related the success of the experiment made at Oxford by Dr. LOWER, of transfusing the blood of one animal into the body of another, viz. that having opened the jugular artery of a mastiff, and injected by the means of quills the blood thereof into the jugular vein of a grey-hound; and opened also a vein in the same grey-hound to let out so much of his blood, as was requisite for the receiving that of the mastiff, the mastiff at last died, having lost almost all his blood, and the grey-hound having his vessels closed, survived and ran away well.

Mr. BOYLE was desired to procure from Dr. LOWER a full description of the method used by him in the performance of this experiment, and to let him know, how acceptable it would be to the society, to receive such an account, they having a design to get the experiment made before them.

Mr. BOYLE was likewise desired to engage Dr. LOWER in the making of the experiment of changing a dog's skin.

¹ Letter-Book, vol. I. p. 319.

² Ibid. p. 332. The substance of this and of the other letter of June 2, is printed in the Philos. Transact. n° 16. p. 285, & seq.

Sir THEODORE DE VAUX produced a paper, containing a relation, formerly sent to Sir THEODORE MAYERNE, of an aged woman, named SARAH HASTINGS, who had taken worms out of the teeth, gums, tongue, throat and face of several persons; Sir THEODORE MAYERNE affirming with his own hand on the back of the letter, that himself had seen the like operations of this woman performed before King CHARLES I. at Whitehall, in 1642.

This paper was ordered to be filed up.

This gave occasion to discourse concerning the breeding of worms in all kinds of animals, especially in all young fat beasts; which worms were affirmed to come out and change into flies, particularly in hogs, that are fatted with nuts.

Some affirmed, that the roots of the horns of deer falling off every year in April were eaten and loosened by worms; and that the itch of this gnawing caused the deer to rub and thrust off their horns against the trees, which they met with. But others were of opinion, that the new and copious afflux of the humour of these deer thrust the effete horns out of their place.

The experiments appointed for the next meeting were

1. To shew the lines, which the two balls affixed to a pendulum in their circular motions make, with letting some sand run out as they move round, relating to the experiment mentioned at the meeting of May 23.

2. Mr. DANIEL COXE to produce the silver-powder, into which gold had been transmuted.

June 27. Mr. THOMAS CRISPE was admitted.

Mr. NELTHROPE was elected and admitted.

Dr. WILKINS related, that Dr. BARWICK had been cured of the plague by the means of salivation, effected by Mr. HUES's powder. He was desired to procure the particulars in writing.

Mr. BOYLE mentioned, that he had particularly observed in the thunder of the day preceding the extreme swiftness of the *fulmen*, which then fell and broke with the appearance of a flame, like that of a cannon-shot, seen by himself and others at the Pall-mall of St. James's Fields; and that the noise of the thunder, which belonged to that *fulmen*, was heard a considerable time after the whirling noise of the *fulmen* was passed; though, as he and others had observed, a noise moves considerably swifter than a bullet shot off.

He took notice likewise, that he had observed in the same place the whirl-wind preceding the said thunder, and found by inquiry, that it had extended to about a

! PETER BARWICK, M.D.

O 2

mile

mile and half from London, where workmen labouring about a house had not been able to keep their standing, without taking fast hold of posts and other things therabouts.

Mr. Hooke produced a new substance fit for a hygroscope, much stronger and better than the beard of a wild oat. It was the cod of a vetch, which was tried before the society, and answered expectation.

He brought in likewise his observations made upon Jupiter, June 26, with a sixty-foot glass, which were ordered to be registered^a.

The observations of the solar eclipse on the 22d of June, made by Mr. WILLUGHBY, Dr. POPE, Mr. HOOKE, and Mr. PHILIPS were also communicated, and ordered to be registered^a.

Dr. POPE brought in the dimensions of an ox of unusual size, weighing 2368 pounds, and being five yards, wanting a handful, long, five yards and one handful high, and three yards and one handful in girth.

Dr. CROUNE produced a piece of that nitre, which is called *antient nitre*, brought by him from Montpellier, and there said to have been taken up at Alexandria near a lake; esteemed, as the doctor observed, to be that antient nitre, by reason of its usefulness in making counterfeit gems, and whitening of linnen. It had the taste of a sea-salt, and somewhat of a sulphureous stinking smell. It was recommended to Dr. GODDARD to dissolve a part of it.

Dr. CROUNE acquainted the society out of a letter, which he had received from Mr. NICHOLAS STENO out of Italy, that there was at Rome a Sicilian artist, who believed, that he had found out a method of working hyperbolical-glasses. He was desired to make farther inquiry after the particulars of this invention, and in case any glasses were actually made of that figure, what were the performances thereof.

He related, that there was a salamander sent to the great duke of Florence, which being sick was cast into the fire, where vomiting out a certain stuff, it put out the fire, and then seemed to lie there quietly.

This was confirmed by Mr. BOYKE and Mr. WILLUGHBY, as to other salamanders; and the latter of these two having proposed, that whereas the water-neut seems to be *salamandra aquatica*, some of them might be provided against the next meeting, to try what they would do, when cast into the fire, it was ordered, that some both water and land neuts should be provided by the operator against the next meeting.

^a They are not in the Register, but are printed in the Philos. Transact. n^o 14, p. 145, for July, 1666.

^a Register, vol. iii. p. 175. See Philosoph. Transact. n^o 17, p. 295, for Sept. 1666.

The experiments appointed for the next meeting were

1. The prosecution of a circular pendulum to be applied to a clock.
2. The two balls on a pendulum, to shew the motion of the earth and moon, with the contrivance of a sand-box to have the sand run out, for representing the line of that motion.
3. The springy fiddle upon two wheels.

July 4. There was no meeting of the society on the account of the fast, but there was one of the COUNCIL, at which were present

Dr. WILKINS, vice-president

Mr. BOYLE

Sir ROBERT MORAY

Sir PAUL NEILE

Mr. AERSKINE

Mr. PALMER

Sir ANTHONY MORGAN

Dr. GODDARD

Dr. WHISTLER

Mr. CREED

Mr. COLWALL

Mr. OLDENBURG.

It was order'd, that the treasurer pay into the chest of the society the sum of one hundred pounds, part of such monies as he had collected for the society; which sum was accordingly put into the chest at this meeting :

That the president, accompanied with Sir ROBERT MORAY and Sir PAUL NEILE, present to the king, when they shall see convenient time for it, the report of the lords commissioners about the business of Chelsea-college : As also that the treasurer issue out such sums of money for the occasions of that business, as should be thought necessary by Sir ANTHONY MORGAN : And

That the answer brought in by Mr. PALMER to the case concerning the plurality of deputations of vice-presidents (as it was stated at the meeting of the council on the 4th of June last) be recorded in the journal-book of the council, viz.

" I do conceive, the president can make but one deputy at one time ; but I do conceive, if he make two deputations to two several persons, to avoid the inconvenience of the absence of one of them, that such of the deputies, as come first, may act, and the entry will be before such an one lawfully deputed ; and there being no matters of moment then acted, it will do well enough. But if one deputy sit, and after another, the deputation to the first ceaseth."

July 11. At the meeting of the SOCIETY on the same day, Mr. EDMUND KING was proposed candidate by Dr. WILKINS.

Sir ROBERT MORAY presented to the society a book, intituled *Del Arcano del Mare*, written by Sir ROBERT DUDLEY duke of Northumberland.

He

He produced a substance taken out of the stomach of a sheep, of the figure of half a ball.

Mr. OLDENBURG related out of a letter to him from Dr. BEAL, dated July 7, 1666. that the said doctor had seen and handled a stone, cut in Easter-week preceding out of the womb of one Mrs. WINDHAM in Somersetshire; and that he had examined it, whether it were not a foetus petrified; but that he could not determine it: that there was no feature visible, tho' that might be covered with a tegument: that it was very whitish, and so crudely and faintly petrified, as to be easily friable, some parts by handling or carriage being rased off: that it was light for a stone, and, as he was informed, much diminished in bulk: that he had weighed it in gold scales, and found it of somewhat less than four ounces weight*: that it was intended for a present to the society by a kinsman of the lady; and that the chirurgeon of Shirbourn, who cut it out, would give an account of his operation.

Mr. WILLUGHBY moved, that it might be inquired into, whether it might not be got out of the bladder into the womb.

It was ordered, that Dr. BEAL should be desired to encourage the intention of sending the said stone to the society.

Dr. CROWE mentioned, that he had a stone, that would keep the light of the fire a good while, and was desired to produce it at the next meeting.

He produced a letter, written to him by NICHOLAS STENO, from Rome, May 23, 1666. mentioning, 1. The emulation between DIVINI and CAMPANI about optic glasses. 2. That CAMPANI had been mistaken in some of his observations, taking the spots adhering to the body of Jupiter for the shadows of his satellites. 3. That the chevalier CORVINI had assured him, that he had cast a salamander, brought him out of the Indies, into the fire; whereupon the animal swelled presently, and then vomited a good quantity of thick viscous matter, which put out the neighbouring coals, whither the salamander retired presently, putting them out again the same way as soon as they rekindled, and by this means saving himself from the force of the fire for the space of two hours, the chevalier CORVINI being then unwilling to hazard the creature any farther. That afterwards it lived nine months. That he had kept it eleven months without any other food than what it took by licking the earth, on which it crept, and on which it was brought out of the Indies; which at first was covered with a thick moisture, but being dried afterwards, the urine of the animal served to moisten it. At the end of eleven months, when the owner had a mind to try how it would do upon Italian earth, it died three days after the earth was changed. 4. That he, STENO, had begun to dissect tortoises; the particulars of the observations upon which he would send at large at another time; but that having cut off the head of one, it was found to keep motion and feeling for above twenty-four hours after, stirring

* See Philos. Transact. n° 18. p. 320. for Oct. 1666.

† See Philos. Transact. vol. i. n°. 21. p. 377.

several parts of the body, according as he touched several places in the joinings of its scales.

Mr. HOOKE's observation on Saturn, made June 29, 1666, was read, and ordered to be registered¹.

Mr. HEVELIUS's letter to Mr. OLDENBURG of July 3, 1666², was read, acquainting the society, 1. That he had answered Monsieur AUZOUT's exceptions to his observations on one of the late comets, and sent several copies thereof to England by sea, desiring the society to examine and consider the whole, and submitting it to their judgment. 2. That Signior BURATTINI was still employed in Poland in making long telescopes. 3. That himself, HEVELIUS, was ready to contribute what he could for the composing of a natural history.

Mr. OLDENBURG produced an account given by some Parisian astronomers of the late eclipse of the sun, observed June 22, 1666³. It was ordered, that it be compared by Mr. HOOKE with the observations made in England, and read before the society at their last meeting.

A paper of Mr. BOYLE was read, containing a new frigorific experiment, shewing how a considerable degree of cold may be suddenly produced without the help of snow, ice, hail, wind, or nitre, and that at any time of the year, by sal armoniac. It was ordered, that this paper be registered⁴; and that the operator provide a pound of sal armoniac, and as much nitre, against the next meeting, to try which of these two salts has the greater strength to cool.

Mr. DANIEL COXE mentioned, that he had a kind of vitriol of considerable force to freeze. He was desired to produce some of it at the next meeting for a trial, which he promised to do.

Dr. GODDARD produced the solution of nitre, recommended to him at the last meeting; and gave an account, that he had dissolved some of that nitre, said to be the nitre of the ancients, in common water, which being evaporated, ran into square grains like common salt.

It was ordered, that the experiment with the pendulum and two balls be better fitted for the next meeting.

July 18. At a meeting of the COUNCIL were present

¹ Register, vol. iii. p. 176. It is printed in Philof. Transact. n° 14. p. 246.

² Letter-Book, vol. 1. p. 338.

³ Printed in Philof. Transact. n° 17. p. 296.

⁴ Register, vol. iii. p. 144. It is printed in Philof. Transact. n° 15. p. 255, for July 1666.

The President

Sir ROBERT MORAY
 Sir GEORGE ENT
 Mr. AERSKINE
 Dr. GODDARD

Mr. PALMER
 Mr. NEILE
 Mr. CREED
 Mr. OLDENBURG.

Sir ROBERT MORAY was by the president nominated vice-president, and sworn as such.

N^o. 15. of the *Philosophical Transactions* was licensed.

At the meeting of the SOCIETY on the same day, Mr. KING was elected.

Sir ROBERT MORAY presented the society with some bags full of several sorts of ore and curious stones, and with ninety-six old Roman brass coins, said to have been dug up about ten miles from Worcester.

He produced likewise a very curious wasp's nest wrought by the insect into hexangular cells.

The president communicated a second letter from the earl of Sandwich, together with some celestial observations made by his lordship at Madrid, accompanied with a desire of a correspondence in England in making observations.

The president was desired to thank the earl for his respect to the society; and it was ordered, that Mr. HOOKE should give in writing what had been done in England in that matter, and what was intended farther; as also that the observation of the late eclipse of the sun should be sent to his lordship; and that Dr. POPE and Mr. HOOKE should join in making observations answerable to those, that were intended to be made in Spain.

Notice was given by Sir ROBERT MORAY, that Mr. MAY had sent in for the repository the skin of an antelope, which died in St. James's Park.

The lord BRERETON produced some pieces of glass taken out of the window of a church both on the north and south side of it, observing, that they were all eaten in by the air; but that the piece taken from the south side had some colours like those of a rainbow upon it, which the other from the north side had not.

His lordship promised to give in an account, as soon as he conveniently could, of his salt-pits.

He likewise mentioned, that at his house in Cheshire good ale had been brewed of oats without malting; as also, that about his house the water was vitriolate, which he found by putting galls into it; which being done in September, turned it immediately black; but in spring, only into a crimson colour, and that after nine or ten days after the infusion.

An experiment was tried with sal armoniac and salt petre, to see, which of the two had the greatest force to cool. But the experiment not being ordered as it should have been, the curator was charged to let it be made at the next meeting with the salts put into an equal quantity of water in the same vessel, observing the same time with both.

The circular pendulum applied to a clock being enquired after, the president affirmed, that he had made trial of one, and observed the motion of it for four days, in which time it had gone so equally with his pendulum-clock, that after those four days were elapsed, he found it only to have gone one minute too fast.

The experiment with the pendulum and two balls not yet succeeding, it was referred to the next meeting; when also the experiment shewing, that a circular pendulum is the same with two pendulums crossing one another was ordered to be made; as likewise that of the water-neuts.

Mr. DANIEL COXE was desired to bring in to the next meeting the white powder made out of gold, and the vitriol for the producing of gold.

July 25. Mr. KING was admitted.

The experiment of cooling water with sal armoniac and salt-petre was tried separately. The spirit of the sealed thermometer standing at $12 \frac{1}{2}$ degrees, and having first subsided in cold water, so far as it could, viz. to $8 \frac{1}{2}$ degrees, a quarter of a pound of sal armoniac was put into it at $4^h 56^m$: whereupon the spirit descended to $4 \frac{1}{2}$ degrees in 8 minutes, and after that time was found to descend no lower. Then into the like quantity of water in a like glass vessel was put the same sealed thermometer, after it had recovered the height of $8 \frac{1}{2}$ degrees, and then a quarter of a pound of salt-petre being put in at $5^h 13^m$ the spirit descended a little below 4 degrees in the space of $7 \frac{1}{2}$ minutes.

Some of the members of the society expecting, that the sal armoniac should cool more potently than the nitre, scrupled the goodness of the sal armoniac; but Mr. HOOKE affirmed it to be very good. The experiment was tried with bay-salt, but that made the spirit descend from $8 \frac{1}{2}$ degrees to $7 \frac{1}{2}$ in 5 minutes.

It was ordered, that Mr. HOOKE should privately try the same experiment again, and add some others of the same kind, and give an account of the success at the next meeting.

An experiment was tried to shew, that the circular pendulum is the same with two pendulums crossing one another, and was ordered to be repeated at the next meeting, making the contrivance so, as that the centers might be in the same plain and at a greater distance.

The experiment frequently made to represent the earth's and moon's compound motion by two balls suspended on a line, being found not to answer expectation,
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which was to see, whether the center of gravity be in the middle of the ellipsis, was laid aside.

Col. BLOUNT mentioned, that having made some cherry-wine, he found, that the yeast rising from thence was better and stronger than our yeast.

Some of the society observed, that raspberries and elder-berries yielded likewise a very good yeast.

Colonel BLOUNT was desired to try, whether French wine or cherry-wine yielded more and better spirit, taking the same quantity of each of these liquors.

He affirmed, that gooseberries ripe enough make a good strong and lasting wine, excelling the best rhenish, if well sugared.

The lord BRERETON remarked, that plum-wine tasted like a kind of Languedoc wine, with an aromatic scent.

The experiments appointed for the next meeting were,

1. The circular pendulum.
2. Experiments with cooling salts.
3. Water-neuts.
4. The wheel-saddle.

August 1, being the fast-day, the society did not meet.

August 8. At the meeting of the COUNCIL were present

The President

Sir ROBERT MORAY
Mr. AERSKINE
Mr. PALMER
Dr. GODDARD

Mr. COLWALL
Mr. NEILE
Mr. CREED
Mr. OLDENBURG.

It was ordered, that N°. 16 of the Philosophical Transactions be printed.

It was resolved, that the original of the late lord MASSERENE's letter, concerning the hundred pounds intended by him as a donation for the use of the society, written to Mr. BOYLE and Sir ROBERT MORAY, be sent to one of the members of the society residing at Dublin, who should be desired to deliver a copy of it to the present lord MASSERENE, to see his inclination to the performance of that intention.

At

At the meeting of the SOCIETY on the same day,

The president produced another letter of the earl of Sandwich, dated at Madrid in July, containing his lordship's observations of the late solar eclipse of June 22, together with some others of the moon's bearing. They were read, and referred to Mr. HOOKE.

Mr. OLDENBURG presented the society from Mr. HEVELIUS with his book concerning the two late comets, together with his *Mantiffa* to his *Prodromus Cometicus*.

The president, Sir PAUL NEILE, Dr. WALLIS, Dr. GODDARD, Dr. WREN, Dr. POPE, and Mr. HOOKE were desired to peruse and consider this book, and to bring in a report of it to the society, to whose judgment the author had submitted it.

A letter of Monfr. AUZOUT to the society, dated at Paris July 16, 1666, N. S. * was read, acknowledging the honour done to him by their electing him of their body.

Mr. HOOKE exhibited his observations of the comet in the end of the year 1664, intimating, that he intended to publish them very shortly †.

He produced a certain contrivance to shew, that the circular pendulum was made of two strait lines crossing one another.

Dr. GODDARD suggested, that the wire moving in a strait line, and pretended to keep equal time with the circular pendulum, should move upon two pivots, as the other did upon four, to be upon equal terms.

The president reported, that the experiment mentioned April, 18, 1666, by Mr. POVEY, of a new way of laying on colours, had been made that morning by Mr. STREETER at his house before himself, Sir ROBERT MORAY, Mr. SLINGSBY, Mr. POVEY, Dr. CHARLETON, Mr. HOOKE, and Mr. OLDENBURG, viz. that an egg was beaten yolk and white together, with a few shreds of a fig-tree branch, whereby the egg was reduced into an oily substance, without any tenacity or ropiness, so that it would be ductile, and fall on the pencil like oil; having likewise this quality, that being mixed with any colour it would lose its own in it, and make a picture without any glaring, however placed against the light; of which an example had been seen in Mr. POVEY's house. Besides that whereas oil makes all colours yellow in time, and size washes off; this liquor will not suffer the colours to turn yellow, nor easily wash off, if it were kept but two or three months within doors to contract some hardness. It was added, that any part of a fig-tree, the juice, a sprig, the leaves, or the shreds of a branch, would produce this effect at any time of the year.

* Letter-Book, vol. i. p. 342.

† They are published among his *Lectures and*

collections, at London, 1678, in 4^{to}.

Dr. MERRET moved, that it might be tried, whether other lactescent plants, especially acrimonious ones, would not perform the same thing, it being probable, that by the corrosion of the juice of the fig-tree, the fibres of the egg were destroyed, and the liquor, that was tenacious before, made ductile afterwards.

He mentioned, that he had some time before suggested to a painter a way of purifying oil, delivered by SENNERTUS, viz. by percolating it through sand; and that he had been lately informed by that painter, that it had succeeded well.

Some of the members conceived, that the sand stopt and kept the saline particles of the oil, since the oil thus defecated and robbed of its salts would quickly become rancid.

There was produced a box of several stones and minerals presented by Sir ROBERT MORAY for the repository, and reduced into order by Mr. HOOKE.

Some experiments were tried to produce cold with several salts. Mr. HOOKE affirmed, that he had found, that white salt, vitriol, and allum had not any sensible virtue to refrigerate. Sandever and pot-ashes being tried before the society, it was found, first, that the spirit of wine in the thermometer standing at $\frac{1}{2}$ below one, descended, after the throwing in a quarter of a pound of sandever into the water, one degree in about 5 minutes. Secondly, that the spirit standing at $3\frac{1}{4}$ quarters below one, did, after throwing in a quarter of a pound of pot-ashes into $\frac{1}{2}$ of water, rise above $\frac{1}{2}$ of a degree in 4 minutes.

Mr. HOOKE was ordered to prosecute at the next meeting the circular pendulum, and also to shew his new watch, affirmed by him to be more exact than any pendulum-watch; and to produce some water-neuts for the experiment appointed before.

August 15. The contrivance for the experiment appointed to shew, that the circular pendulum was made of two strait lines crossing one another, being fitted, as was suggested at the preceding meeting, it appeared, that the motion from the one end of the greater diameter of the circular pendulum to the same end again was equal to two vibrations of the strait line pendulum, equal in length to the former, and moving in the same plane.

The correspondence desired by the earl of Sandwich in making observations of the moon's bearing being again mentioned, it was ordered, that the mathematical professors should be desired to take care of that business, and call in to their assistance Mr. STREET or such others as they thought fit.

The trial of the lactescent and caustic plants, besides the fig-tree, for preparing a new kind of paint with beaten eggs, was committed to Dr. CHARLETON.

The materials for cooling being again spoken of, it was ordered, that Mr. BOYLE should be desired by Mr. OLDENBURG to provide himself some sal armoniac,

moniac, as preferred by him to nitre in point of cooling, for repeating the experiment.

Sandever and pot-ashes having been tried as to their virtue of cooling, occasion was taken to discourse of the nature of sandever; and it was observed by Sir ROBERT MORAY and Mr. HENSHAW, that there was something more in sandever than other salts; Sir ROBERT particularly remarking, that when no borax, nor any thing else would dissolve gold, pretended to have been unbodied and irreducible, sandever would do it.

Sir ROBERT MORAY related, that kelp was an excellent manure for land, and that in some parts of Scotland no manure was used but that, the country people sowing their corn upon sand, and covering it over with kelp, without any other care; and that the land yielded twenty for one.

A letter from Dr. WALLIS to Mr. OLDENBURG dated at Oxford, August 11, 1666⁷, was read, importing, that whereas he had used to observe in his baroscope, that the sun-shining made the quicksilver to rise, in which the observations of others had concurred with him; he had this summer in the hot time of June, July, and August observed the mercury constantly to rise in the night, and to fall in the day, notwithstanding the hot sun-shine.

The president affirmed, that he had generally observed the contrary in his baroscope.

Mr. OLDENBURG read the relation sent him from Paris about a kind of worms observed in the abbey of Caen to eat out stones, and to feed upon them⁸. He was desired to endeavour to procure some of those worms to be sent over with some of that in a box. And since there were many old churches in England built of Caen-stone, the members were desired to observe, as they had opportunity, whether there were any such worms found in the stones of such churches.

A list being read of those particulars, which, since the society's resuming of their meetings, had been recommended to the care of the several members; it was ordered, that every one of them, according as they appeared at the meetings, should be put in mind of their several tasks; Mr. BOYLE, of giving in the experiments of sounds, made the preceding summer at Oxford; Dr. CLARKE, of the experiments of injection; Sir ROBERT MORAY, of perfecting his history of masonry; Mr. DANIEL COXE, of the experiments of the nature and figure of all sorts of salts, as also of transmuting water into earth, and gold into silver, and of producing cold by a kind of vitriol; Mr. HOOKE, of perfecting his new quadrant; of producing a new sort of watch more exact than a pendulum-watch; of observing the parallax of the earth's orb; of prosecuting the magnetical experiments, first for finding out whether gravitation be something magnetical; and then whether the magnet will

⁷ Letter-Book, vol. i. p. 346.

⁸ See *Journal des Sçavans*, n^o xxxii. 9 August,

1666, p. 635, edit. Amsterdam, 1679, & Phil. Transact. n^o 18, p. 321, for October 1666.

attract at the same distance in water, as in air; as also whether the lines of a load-stone's direction are truly oval.

The experiments appointed for the next meeting were

1. The circular pendulum to be profecuted :
2. The new watch to be produced :
3. Some water-neuts to be provided.

August 22. DAVID lord viscount STERMONT was proposed candidate by Sir ROBERT MORAY; but there not being a sufficient number of members present for election, it was deferred till the next meeting.

Mention was made by Sir ROBERT MORAY, of a new kind of watch contrived by Mr. NICHOLAS MERCATOR, representing the motion of the equation of time. It was ordered, that the secretary should desire Mr. MERCATOR, if he made it not a secret, to produce it before the society at their next meeting.

Mr. HOOKE was desired to bring in at the next meeting his new watch, which he formerly mentioned to be exact as a pendulum.

He was ordered to observe, whether the circular motion be compounded of fines.

Sir ROBERT MORAY mentioned, that he had received some stag's tears, sent him out of Warwickshire, being a substance like ear-wax, of a strong smell, yet not unpleasant.

Sir THEODORE DE VAUX produced some papers, which were read, containing a relation of a furred robe, made of the skin of the Tartarian boramez, supposed to be a plant animal; which robe was said in that paper to be kept in the library at Oxford, to which it was given by Sir RICHARD LEA, ambassador in Russia in the reign of Queen ELIZABETH.

Dr. WREN was desired to inform himself concerning this robe, and to view it at his return to Oxford; and the amanuensis was ordered to take a copy of these papers to be filed up.

Sir ROBERT MORAY mentioned, that the King had been discoursing of ant's eggs, and inquiring how they came to that bigness, which sometimes exceeded that of the insect itself.

Mr. KING related hereupon several particulars, that had fallen under his observation, concerning several sorts of ants and their eggs, which he, at the desire of the society, promised to give in writing at the next meeting.

Dr.

Dr. WREN affirmed, that in Wiltshire it was usual, when mites were gotten into the wheat, to put ants among them, which killed all the vermin, without destroying the wheat; and that some persons put ants upon trees infested with worms, and thereby freed them from their noisomeness, the ants themselves doing the trees no harm.

It was moved, that it might be observed, whether the wheat thus freed from worms by ants would grow, it being believed, that the ants eat the germs of the corn.

Mr. HOOKE remarked, that he had observed with a microscope, how the leaping cheese-maggots put their tail into their mouth, and when they leap, spring it out with great force, to leap a great way like fleas.

Sir THEODORE DE VAUX presented a paper of enlumineure, which was recommended to Mr. EVELYN to peruse, and to give the society an account of.

He mentioned the art of enamelling of Mr. PETITOT, and promised to use his interest to procure an account of it for the society.

This gave occasion to mention, that Mr. POVEY had intimated, that, upon the society's desire, Mr. PETER LELY, Mr. COOPER, and Mr. STREETER would perhaps not be unwilling to communicate to them the several curiosities and varieties of painting. Whereupon it was ordered, that Sir THEODORE DE VAUX, Mr. POVEY, Mr. EVELYN, Mr. HENSHAW and Mr. HOOKE, or any two or more of them, should be desired to meet and consider together, what particulars were fit to inquire into, and thereupon to discourse with the said masters concerning the same.

Mr. OLDENBURG read part of a letter of Dr. WALLIS to him, dated at Oxford, August 18, 1666^a, desiring, that certain observations about the tides might be made by the society's order, to see how matter of fact would agree or disagree with his hypothesis. It was mentioned, that the president having already seen this letter at his house, had already undertaken to recommend those observations to several persons living near the Thames. And Sir ROBERT MORAY relating what he had observed in Scotland concerning a certain and constant proportion of the increase of the tides from the quarter to the spring-tide, and their decrease from the spring-tide to the quarter, as likewise of the ebb's rising and falling constantly after the same manner; he was desired to put the particulars of it in writing, and to draw up directions for observations, to find out in what proportion these increases and decreases, risings and fallings happen to be in regard of one another; which proportion Sir ROBERT conjectured to be that of lines, or something near it.

Mr. HOOKE mentioned a new astronomical instrument for making observations of distances by reflection, and was desired to give order for the construction of it, and to produce it before the society.

^a Letter-Book, vol. i. p. 347. It is printed in the Philos. Transact. n^o 17, p. 267.

He remarked, that he had observed a kind of shell-fish, called limpets, to make holes in rocks of the sea above an inch deep, just of the bigness of their shell, which was of the figure of a snail.

The experiment of transfusing blood out of one animal into another being again mentioned, it was ordered, that Dr. BALLE, Mr. DANIEL COXE, Mr. THOMAS COXE, Mr. KING, and Mr. HOOKE should be desired to undertake the making of this experiment; and having considered what apparatus was necessary to perform it, to set speedily upon the work.

Dr. CROUNE communicated a letter of Mr. NICHOLAS STENO, as also a scheme of the several new chariots lately contrived in France; together with the ways of preparing alkermes, verdegrease, and white wax: all which were referred to the next meeting.

August 29. At a meeting of the COUNCIL were present

The President

Sir ROBERT MORAY
Sir PAUL NEILE
Sir GEORGE ENT
Mr. AERSKINE

Mr. PALMER
Mr. NEILE
Mr. CREED
Mr. OLDENBURG.

It was ordered, that Mr. HEVELIUS having desired such books, as had been lately published by any fellows of the society, and such others, as were curious and philosophical, lately printed, the secretary should provide them, and shew the list of them to the council; and that the treasurer of the society should pay for them:

That the amanuensis should make a copy of the warrant for demanding a body for dissection, to be performed in Gresham-College by some of the members of the society at their own charge: And

That n^o 17 of the *Philosophical Transactions* be printed.

At the meeting of the SOCIETY on the same day,

The lord viscount STERMONT was elected and admitted.

Mr. MERCATOR produced a watch of his invention, representing the equation of times. The society having viewed and approved it, desired him to bring in the demonstration of it, viz. that his tables of equation are true; and that the motion of the watch agrees therewith.

Mr. HOOKE produced also a new piece of watch-work of his contrivance, serving to measure time exactly both by sea and land; of which he was ordered to bring in the description.

He

He mentioned again a perspective, which he was preparing for observing the positions and distances of fixed stars from the moon by reflexion; and was desired to have it made with speed, and to bring in the description of its structure and uses.

Mr. KING read his discourse concerning ants, which was ordered to be registered^b.

Mr. DANIEL COXE shewed some of the white powder, into which he affirmed that he had transmuted gold. He was desired to transmute a greater quantity for fluxing, and to do it with a dissolvent, that had nothing metalline in it, the society being at the charge of the operation.

Sir THEODORE DE VAUX communicated a paper found among those of Sir THEODORE DE MAYERNE, concerning the nature of craw-fish; which was ordered to be copied, and filed up, after the copy had been perused by Sir GEORGE ENT for his animadversions upon it, and additions to it.

Mr. OLDENBURG read a paper, borrowed of one Mr. ROBINSON, concerning the fall of ashes into a ship sailing in the Archipelago in 1631, at the time of the eruption of mount Vesuvius^c, agreeing with what Mr. EVELYN had formerly communicated.

There were also produced from the said Mr. ROBINSON two of the first microscopes made by the direction of GALILEO, and sent from him to the said Mr. ROBINSON, together with GALILEO's letter dated in 1646.

Sept. 5. The society could not meet by reason of the late dreadful fire in London^d.

Sept 12. At the meeting of the COUNCIL were present

The President

The lord bishop of Exeter
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE
Mr. MATTHEW WREN
Dr. WHISTLER

Dr. GODDARD
Mr. COLWALL
Mr. NEILE
Mr. CREED
Mr. OLDENBURG.

It was resolved, that the society should meet the next time in Dr. POPE's lodgings in Gresham-College. And by reason, that the former place of meeting for the society, and other rooms also convenient for the same, were taken up for the use of the lord mayor of London and the city, it was ordered, that the president, Mr. AERSKINE, Sir ROBERT MORAY, Sir PAUL NEILE, Dr. BALLE, Mr. OLDEN-

^b Register, vol. iii. p. 153. It is printed in Philof. Transact. vol. ii. n° 23, p. 425, for March 1667.

^c This paper is printed in the Philof. Transact. vol. i. n° 21, p. 377, for January 1666.

^d It began on Sunday September 2.

BURG, or any two of them, should be a committee to consider of another place for the future meetings of the society, in case they could not be at all continued in Gresham-College; and that for that purpose the said committee should meet on the Tuesday following about six of the clock in the evening at Arundel-house.

At the meeting of the SOCIETY on the same day,

Sept. 12. Mr. MERCATOR produced his watch again, and declared, that his demonstrations for it consisted only in this, that he could shew, that his tables of equation were true; and that the motion represented thereof in his watch agreed with those tables.

Mr. HOOKE presented his new perspective for taking angles by reflexion; which was approved of by the society, and he was desired to bring in the description of it in writing.

The society being taken up for the most part of this meeting with the consideration of the place for their future meetings in that time of public disorder and unsettlement by reason of the late fire, was thereby hindered from making experiments, and discoursing of philosophical subjects, as they used to do.

Mr. OLDENBURG acquainted the society, that Mr. HEVELIUS had sent him duplicates of the four copies of his second book concerning the late comets, with a desire, that in case the former were come safe to hand, these might be distributed to such other persons, as were conversant in the subject. Whereupon he had delivered them, one to the president, another to Sir PAUL NEILE, a third to Dr. CHRISTOPHER WREN, and the fourth to Dr. WALLIS, as the copy in the former packet designed for the last, and sent to him to Oxford, had miscarried.

Sept. 19. At the meeting of the COUNCIL were present.

The President

The lord bishop of Exeter
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE

Mr. COLWALL.
Mr. NEILE
Mr. CREED
Mr. OLDENBURG.

The president reported, that Mr. CHARLES HOWARD had very freely offered convenient rooms in Arundel-house both for the council and the society to meet in, if there were occasion for it: upon which thanks were ordered to be returned to Mr. HOWARD for this great respect and civility to the society.

Sir ROBERT MORAY acquainting the Council with Mr. BALLE's desire of keeping for himself some of the *apparatus magneticus* belonging to the society, being things of the least use to the public, amounting to the value of eighteen pounds, the council granted his desire, Mr. BALLE paying in the said sum.

At

At the meeting of the Society on the same day,

Mr. Hooke shewed his model for rebuilding the city to the society*, who were well pleased with it; and Sir JOHN LAURENCE, late lord mayor of London, having addressed himself to the society, and expressed the present lord mayor's† and aldermen's approbation of the said model, and their desire, that it might be shewn to the King, they preferring it very much to that, which was drawn up by the surveyor of the city; the president answered, that the society would be very glad, if they or any of their members could do any service for the good of the city; and that Mr. Hooke should wait on them with his model to the King, if they thought fit to present it‡: which was accepted with expressions of thanks to the society.

Sept. 26. There was read a description of the method of transfusing the blood of one animal into another, as it had been practised with success at Oxford by Dr. RICHARD LOWER; which description was communicated by him in a letter to Mr. BOYLE. It was ordered to be registered^b, and Mr. DANIEL COXE, Mr. THOMAS COXE, Mr. KING, and Mr. HOOKE were appointed to be curators of this experiment, first in private by themselves, and then, in case of success, in public before the society; and Dr. GODDARD, Dr. MERRET, Dr. CLARKE, Dr. CROUNE, and Dr. BALLE were desired to be present at the experiment.

Capt. SILAS TAYLOR presented the society with a collection of curiosities, among which was a piece petrified and concreted of mud, wood, and shells. Mr.

* Mr. WALLER in his life of Dr. Hooke, p. 13, prefixed to his *Posthumous Works*, remarks, that he could not well determine what that model was, but had heard, that it was designed in it to have all the chief streets, as from Leaden-hall corner to Newgate, and the like, to lie in an exact straight line; and all the other cross streets turning out of them at right angles; all the churches, public buildings, market-places, and the like, in proper and convenient places: which no doubt would have added much to the beauty and symmetry of the whole.

† Sir THOMAS BLUDWORTH.

‡ Dr. CHRISTOPHER WREN had before this, as appears from a letter of Mr. OLDENBURG to Mr. BOYLE, dated at London, Sept. 18, 1666, (*Boyle's Works*, vol. v. p. 358) drawn up a model for a new city, and presented it to the King, who produced it himself before his council, and shewed great approbation of it. "I was," adds Mr. OLDENBURG, yesterday morning "with the doctor, and saw the model; which, methinks, does so well provide for security, convenience and beauty, that I can see nothing wanting as to those three main articles; but whether it has consulted with the populousness of a great city, and whether reason of state would

"have that consulted with, is a query to me. "I then told the doctor, that if I had had an opportunity to speak with him sooner, I should have suggested to him, that such a model contrived by him, and reviewed and approved by the Royal Society, or a committee thereof, before it had come to the view of his Majesty, would have given the society a name, and made it popular, and availed not a little to silence those, who still continually, What have they done? He answered, that he had been so pressed to hasten before other designs came in, that he could not possibly consult the society about it. However, since it is done without taking in the society, it must suffice, that it is a member thereof, that hath done it; and by what I see, hath done it so, that other models will not equal it; and I hope, that when it comes to be presented to the parliament, as the author will be named, to his relation to the society will not be omitted." This model was engraved from his own draught, at his son's expence, in 1724, and has since been published.

^b Register, vol. iii. p. 150. It is printed in Philosoph. Transact. vol. i. n^o 20, p. 353, for December 1666.

OLDENBURG was desired to write into Ireland to get such a piece of petrified wood, as is partly wood and partly stone together in one piece.

October 3. A letter of Dr. BEAL to Mr. OLDENBURG, dated Sept. 24, 1666, was read, containing an account, 1. Of a considerable number of oak-trees found in Somersetshire under ground, as black as ebony. 2. Of a saline pool found in rich pasture ground in the same county. It was ordered, that the letter be preserved, and Dr. BEAL desired, to send up some bottles of that salt water, to try how much salt it would yield, into what figure the salt shoots, and what effect it has mixed with several liquors or other substances. It was also directed, that it should be suggested to him, that he would employ Mr. GULSON, living in those parts, and skilful in chemical operations, to make experiments with that water and salt.

Mr. THYNNE offering his service to the society in his voyage to Sweden, it was ordered, that a copy should be made, both of general and particular inquiries, and that it should be recommended to him to procure answers to them.

The lord bishop of Exeter being requested to communicate the observations of Jupiter's satellites made by Mr. LAURENCE ROOKE¹, in order to the calculating of tables of their motion, his lordship desired, that he might be put in mind of it by Mr. HOOKE, and that he would purposely come to his library in Gresham-College to look them out.

October 10. There was no meeting of the society, by reason of the extraordinary fast kept this day.

October 17. Dr. CROUNE produced several schemes of chariots, which he had seen in France, and a paper containing a description in French of alkermes, and its use both for medicine and dying. It was ordered, that the schemes be filed up; and the description of alkermes translated into English by Mr. OLDENBURG, and registered².

Dr. CROUNE was put in mind of his promised description of the making of verdigrise, and of the whitening of wax.

An experiment was tried of the propagation of motion, by a contrivance, whereby two balls of the same wood, and of equal bigness, were so suspended, that one of them being let fall from a certain height against the other, the other was impelled upwards to near the same height, from which the first was let fall, the first becoming then almost quiescent, and the other returning, impelled the first upwards again to almost the same height it had fallen from before, itself becoming then in a manner motionless, till after some returns they both vibrated together.

¹ He by a nuncupatory will left what he had to the bishop of Exeter.

² Register, vol. iii. p. 163. It is printed in

the Philos. Transact. n° 20, p. 362, for December 1666,

It was ordered, that this experiment be prosecuted, and others of that kind thought upon.

Mr. POVEY mentioned, that there was a certain moving sand in Suffolk, that was driven from one part of the country to the other, and had laid waste great parcels of land, and dam'd up a river; a full description of which he promised to procure with the first convenience.

Dr. BALLE presented the society with a box of several curiosities of nature, for their repository.

October 24. Mr. NICHOLAS MERCATOR was proposed candidate by Sir ROBERT MORAY.

The experiment about propagating of motion was prosecuted with three balls, of which the middle remained almost quiescent, though struck by either of the lateral ones, which impelled each other upwards.

It was moved, that the materials for building, and the several sorts of earth for making brick and tile, might be now considered of by the society; who were desired to think upon it against the next meeting. It was mentioned, that there was good terrace in England, especially in Derbyshire.

Sir ROBERT MORAY remarked, that about Plymouth an unusual cave had been found, and in it great bones and vast teeth; that the bones being touched turned all into ashes: That the cave was twenty feet from the surface, and about twenty-four feet square; the vault of it covered with huge icicles, of which the earl of BATH had promised to send up some.

A paper communicated by Sir THEODORE DE VAUX was read concerning several ways of making cheap and sweet fires of coal-balls, wherein sea-coal is by the mixture of other combustible bodies both sweetned and multiplied. The paper was ordered to be filed up.

Sir ROBERT MORAY presented the society for the repository with some stag's tears, as did Mr. JUMPER with several curiosities by the hands of Mr. HOOKE.

It was order'd, that the committee appointed before for the experiment of bleeding one dog into another do meet on the Friday following about two o'clock in the afternoon in Dr POPE's lodgings to make that experiment: as also, that the experiment be afterwards made before the society, in case it should succeed in private; in reference to which Dr. LOWER's paper, about the method to be observed therein, was delivered to them.

October 29. At a meeting of the COUNCIL were present.

The President

Sir ANTHONY MORGAN

Dr. WILKINS

Mr. WILLIAMSON

Mr. PALMER

Mr. COLWALL

Mr. NEILE

Mr. CREED

Mr. OLDENBURG.

It was order'd, that the president, one of the secretaries, Mr. PALMER, Mr. NEILE, and Mr. CREED, or any three or more of them, do meet at Dr. POPE's lodgings in Gresham-college on the Wednesday following, Oct. 31. as a committee of the council to examine the accounts of the treasurer from April 11, 1666, to Michaelmas, and to make a report thereof to the council on Monday Nov. 5:

That the journal of the society be perus'd by the secretary, to find out what had been formerly order'd concerning the payment of the thirty pounds *per ann.* to Mr. HOOKE:

That the sponfors for severall fellows of the society do speak or write to them for the payment of their arrears, and bring in, if they conveniently could, their answer on the Monday following:

That the lord LUCAS, Sir JOHN DENHAM, Dr. SCARBURGH, Mr. DRYDEN and Mr. VERMUYDEN be left out of the account of the arrears:

That Dr. BATHURST and Mr. BAROW be dispensed with as to their weekly payments as to the half:

That the book for subscriptions be carried before the Monday following to the earls of MANCHESTER and CARLISLE to subscribe their names: And

That the list of the present fellows of the society be drawn up against that day, and then read before the council, in order to be printed for the approaching day of the anniversary election.

October 31. At a meeting of the SOCIETY,

It was ordered, that the experiment of bleeding one dog or one sheep into another dog or sheep be made on the Tuesday following in the morning by the committee appointed before for that purpose.

Mention being again made of considering the severall sorts of clay fit for making bricks, Sir PAUL NEILE affirmed, that there was a certain clay in England, which made as good sounding bricks, as any of those call'd klinkers in Holland.

The earl of KINCAIRDIN remarked, that the klinkers in Holland differed from the other bricks chiefly in the manner of burning; those, that lie near the fire, making the more lasting bricks; the remoter from it the softer.

Another member mentioned, that Mr. WYLB^e had a way, by mixing several sorts of earth together, to make hard and lasting bricks.

It was observed by another, that Sir GEORGE DOWNING¹ had commended the bricks made in the isle of Ely, as being equal in goodness to any of the Dutch klinkers.

Mr. HOOKE took notice, that those earths, which will vitrify, make the more lasting bricks.

It was ordered, that Mr. HOOKE should make trials of several earths by burning them in a wind-furnace, to see, which kind would yield the best brick.

The earl of Sandwich's letter to the president from Madrid was read, together with the papers of observations made there. And the president was desired to return the thanks of the society to the earl, and to excuse in the best manner he could their not corresponding with his lordship as he expected, in making the like observations in England.

The papers containing the said observations were delivered to Mr. HOOKE to peruse them, and make a report of them to the society. To which was added a little scheme made by the president.

A letter of Dr. WALLIS, dated at Ashford in Kent, October 23, 1666, was read; giving an account of the great height of the tides about Hythe and Romney-marsh, two or three days after the last new moon of the said month of October; which the doctor looked upon as agreeing with his hypothesis, though the people in the country imputed it very much to the great winds.

The president, and Sir ROBERT MORAY, and as many others, as had an opportunity, were desired to take notice of the ebbs and flows during the whole ensuing month of November, and to recommend the like to their friends, who had the convenience of observing.

Mr. HOOKE produced an inclining pendulum, which, though short, should perform the office of a long perpendicular one, the several degrees of inclination answering the several dimensions of length. It was ordered, that the trial of it should be prosecuted at the next meeting.

Nov. 5. At a meeting of the COUNCIL were present

The lord bishop of Exeter
Sir PAUL NEILE
Sir ANTHONY MORGAN.
Mr. AERSKINE
Mr. PALMER

Mr. NEILE
Mr. COLWALL
Mr. CREED
Mr. OLDENBURG.

¹ He had been several years ambassador to the States-General.

The president being obliged to attend the Queen's council, and Sir ROBERT MORAY, who was vice-president, being also absent at the beginning of this council, the lord bishop of Exeter was deputed and sworn vice-president.

The committee appointed by the council October 29, to examine the accounts of the treasurer from April 1666, to Michaelmas of the same year, made a report of their examination to the council, who approved of it; and ordered thanks to be given to the treasurer, both for the justness of his accounts, and his care and diligence in collecting the arrears.

It was ordered, that the business of the monies, pretended to be due to Mr. HOOKE, be deferred till Dr. WILKINS's return; and that in the mean time all the orders ordered in the journals relating to the same be looked out and produced upon occasion:

That the list of the society read this day before the council be printed, only altering therein what should be ordered on the Wednesday following at the meeting of the society, some persons being then probably to be left out, and some to be inserted: and

That inquiry be made at the next meeting of the society, whether the rooms, now taken up by Sir THOMAS BLUDWORTH, might be had for the society to meet in upon their anniversary election-day.

The lord bishop of Exeter and Sir ROBERT MORAY were desired to speak to Mr. MATTHEW WREN about some rooms in the Savoy for the society.

Sir ROBERT MORAY being come in, did, upon the desire of the lord bishop of Exeter, return to his vice-presidentship, and was by the council again sworn as such.

Novemb. 7. At a meeting of the SOCIETY,

There was read a paper of Sir WILLIAM PERSALL, concerning a new kind of loadstone found in a rock in the isle of Anglesea. It was suggested by the president,

"Mr. OLDENBURG in a letter to Mr. BOYLE, dated Novemb. 15, 1666, (BOYLE's Works, vol. v. p. 363.) observes, that Sir WILLIAM PERSALL, though *much addicted to magnetick*, was *affected not very knowing or discerning in them*; and that in his paper he mentioned, "that there is a rock "of loadstones in the isle of Anglesea hanging "over the sea, of a greenish colour, which he "went lately to see; and breaking off some "stones found, they were perfect magnets, because they would nimbly excite a verforium. "But as to their attraction, they would hardly "take up a needle, though every stone was full

"as big as a man's hand; though possibly towards "the middle, the attraction may prove more "vigorous, the virtue of the outward parts, because exposed to the cold air and winds, being "perhaps much impaired. I took, added Sir WILLIAM, an observation, which gave me great satisfaction, in order to confute Dr. CARTER's opinion, which imports, that the heat of the torrid zone draws the *particula striata* from the north, "which passing by a kind of tranation through "the bodies of magnets, gives them the influence "of their constant position to north and south; "for I made trial by the help of a verforium, "and

sident, that it would not be improper to have the rock cut, and to get some of the inner parts of it for trial. Whereupon it was ordered, that Mr. OLDENBURG should speak to Mr. BAGNAL from the society, and desire him to employ what interest he had in the island for doing what had been suggested. The paper was ordered to be filed up.

Sir ROBERT MORAY mentioned, that an English loadstone had been lately brought out of Devonshire to the King by the sons of Sir WILLIAM STROUD; which he would shew to the society at their next meeting.

Mr. OLDENBURG related, that he had waited on Mr. HOWARD this day to St. Paul's church, where they had been shewn a human corpse, that had been buried, as was conjectured by a stone lying over it, about two hundred and sixty-two years, being found in a vault of St. Faith's church, and no other corpse, as was said, besides it in all that vault; that this body stood stiffly upright on tip-toe, with the head awry turned to the right side; the skin all over, and the sinews and bones all unputrified (except a small part on the backside of the arm, which seemed, as it were, worm-eaten) nothing foetid, nor any ways tainted, only smelling a little musty: that there was found no odorous smell or sign of embalming, though search was made both with hands and eyes in all the usual probable places for it; neither was there seen any sign of fear-cloth, only here and there some threads of the confumed winding-sheet: that there was some hair remaining on the head and chin, and under the arm-pits, which was of a yellowish colour: that the stone next adjoined, and supposed to be the cover of the corpse, had for inscription, as the person, who shewed the corpse, affirmed, *Thomas Preybrack, bishop of London, and chancellor, died anno 1404.*

Dr. CROWE related, that he had also seen a body long since buried taken up unputrified from a great depth; which he imputed to the dryness of the place.

Sir ROBERT MORAY mentioned the many dead corpses unputrified, standing round in the vault of a church in Thoulouze, taken up from under the ground of the same church, where bodies are dried up, and not otherwise consumed.

Mr. COLWALL took notice of the church-yard of the Innocents at Paris, consuming all bodies in the space of twenty-four hours.

The president promised to observe the tide's going down on the Friday following, and to recommend the observation thereof to others.

Mr. AUBREY offered to recommend the observation of tides to the deputy-governor of Chepstow in Monmouthshire: whereupon the secretary was ordered to

"and going about several parts, I found in some out-parts of the rock, wherein the weather and tempests had made great cavities, that some of the poles were directly north-east, and in two places directly east and west."

* ROBERT BRAYNSOOK consecrated bishop of London January 5, 1581, and in September made lord chancellor of England, died August 27, 1404. Godwin de Præsul. Ang. Comment. p. 245. edit. London. 1616, 4^{to}.

procure for him those printed papers, that contain the inquiries and tables concerning them.

Sir ROBERT MORAY proposed, that the directions for seamen, and the inquiries of tides, might be printed separately, and the instruments mentioned in the printed papers concerning these particulars provided, both at the society's expence; and promised, that he would endeavour to procure an order from his Royal Highness the duke of York to Trinity-house, importing, that every captain and master of a ship should take with them in their voyages a copy of such printed books, and make observations and trials accordingly, and write down the success thereof in their journals; of which they should at their return give one to Trinity-house, and another to the society.

This proposal was approved of, and order given, that Sir ROBERT MORAY and Mr. OLDENBURG the secretary should take care of procuring such an order from the duke of York. and of having the inquiries and directions printed, and some sets of instruments provided at the charge of the society.

Mr. HOSKYNs suggested, that it might be inserted among these directions, to fetch up the several sorts of earth from the bottom of the sea.

Mr. HOOKE was ordered to think upon and provide an easy instrument for that purpose.

Mr. HOWARD was put in mind to bring in his account upon the inquiries into agriculture, as it was managed in Surrey and Berkshire.

The inclining pendulum being again spoken of, it was ordered, that it should be fitted by Mr. HOOKE against the next meeting for all inclinations, to bring it at last to rest.

Dr. POPE was desired to speak to Sir THOMAS BLUDWORTH to spare the rooms now possessed by him in Gresham-college, to the society, for their election-day.

It was ordered, that Mr. OLDENBURG should cause extracts to be made in papers by themselves, of the respective experiments committed to several fellows of the society, in order that every one, who stood charged with any, might know the particulars, and mind the better to discharge himself of his task.

Novemb. 13. At a meeting of the COUNCIL were present

The President

The lord bishop of Exeter
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. PALMER
Mr. COLWALL
Mr. NEILE

Sir ANTHONY MORGAN:
Sir GEORGE ENT
Mr. MATTHEW WREN
Mr. CREED
Mr. OLDENBURG.

Sir

Sir ANTHONY MORGAN was desired to speak to the lord HATTON, to know, whether his lordship would continue a member of the society.

It was ordered, that it be proposed at the meeting of the society the day following, whether they thought fit to leave out of their list Monfr. DE SORBIERE; the council inclining to do so, but wanting power actually to do it without the society.

It was resolved, that the society meet upon their anniversary election-day in Dr. POPE's lodgings, if they could not get the rooms taken up by Sir THOMAS BLUDWORTH.

Novemb. 14. At a meeting of the SOCIETY,

Mr. HALES, upon the motion of Dr. POPE, was present at this meeting.

The president nominated, according to statute, five of the fellows of the society, to audit and examine the yearly accounts of the treasurer, viz. Dr. MERRET, Mr. HARRINGTON, Dr. POPE, Mr. AUBREY, and Mr. KING; which five were also, according to statute, chosen by ballot for that purpose, and agreed to meet all, or any three or more of them, on the Wednesday following at Dr. POPE's lodgings before the society should assemble.

The lord ROBARTES, lord privy-seal, and Dr. BENJAMIN LANEY, lord bishop of Lincoln, were proposed by the lord bishop of Exeter, and elected.

Mr. MERCATOR proposed on the 24th of October by Sir ROBERT MORAY, was likewise elected.

The experiment of transfusing the blood of one dog into another was made before the society by Mr. KING and Mr. THOMAS COXE upon a little mastiff and a spaniel with very good success, the former bleeding to death, and the latter receiving the blood of the other, and emitting so much of his own, as to make him capable of receiving that of the other.

It was ordered, that the whole method, and all the particulars of the operation, should be fully described by the curators of this experiment, and brought in at the next meeting.

The experiment of the inclining pendulum was repeated, and Mr. HOOKE was ordered to bring in a scheme of it, and a description of its uses.

Col. BLOUNT gave an account of the improvements of his chariot; how he had made his springs five double on each side, and thereby freed it from tossing; suggesting, that if Mr. HOOKE's springy-saddle should do well, the springs of it must be doubled.

Dr. CROUNE promised to produce his chariot at the next meeting.

Col. BLOUNT presented the society with several particulars very acceptable to them; as 1. Two sorts of English wines, one of two months, the other of fourteen months old, but both of the same soil, cultivated by himself about Deptford; the new wine being somewhat harsh, but the other not unpleasant to the taste, having withal, as some judged, something of the flavour of Rhenish in it. Both took flame. 2. A pea of English growth, which the colonel affirmed to have produced with good tillage, steeping and keeping the ground clean, from one single stem, shooting into several branches, five hundred and thirteen pease the first year; and these the next year a peck and half, and this peck and half the next year five bushels. They were very good eating pease. 3. Two scorzonera roots, the one an inch thick, of four months growth, the other full as thick again of three years growth. He suggested, that this root being so wholesome a food, it should be propagated in England, since it might easily be made to grow there. The colonel mentioning, that it was a good food several ways, was desired to give an account thereof in writing, which he promised to do. 4. A spirit extracted out of cherry-wine, very strong.

Mr. HOSKYNs mov'd, that it might be tried, what quantity of spirits these English wines would yield, compared with French white wines. Dr. CROUNE offering himself to make the trial, Col. BLOUNT promised to send him some quantity of his wine for that purpose.

Sir ROBERT MORAY produc'd a loadstone digged up in England in Devonshire, brought from thence by the sons of Sir WILLIAM STROUD for the king; which was committed to Mr. HOOKE for the repository.

The president related out of a letter of Dr. COTTON, that the latter promised the society an English loadstone of sixty pounds weight.

Mr. AUSTEN produced from Dr. CHARLETON a bird called *Coccothraustes*, together with the Latin description thereof out of BELLONIUS; which new bird was committed to Mr. HOOKE for the repository, and the description ordered to be filed up.

An order of the council was read, importing, that it should be proposed to the society this day, whether they thought fit to leave Monfr. DE SORBIERE out of their list, the council inclining to do so, but wanting power to execute it without the society. After some debate it was put to the ballot, and there were fourteen votes for his continuance, and eight for his expulsion. It being late, it was order'd, that the charter should be consulted concerning the number of votes, that carries the question both for election and ejection.

Nov. 21. ROBERT earl of LINDSEY, lord great chamberlain of England, was elected.

A paper

A paper communicated by Mr. KINO was read, giving an account of the method and success of the late experiment of transfusing the blood of one dog into another; which was order'd to be registered*, as follows:

"In obedience to your commands, we tried this experiment; first by ourselves upon two sheep, viz. Having tied them, and placed them in a convenient posture, we laid bare the carotid artery of the one sheep, near two inches, dividing from it the nerve of the eighth pair; then we made a ligature upon the upper part of the artery (next the head) and tied a false knot; which done, we made another ligature upon the other end next the clavicle, with a riding-knot; then we made an opening on this side of the riding-knot, at a convenient distance, and put in a brass pipe, and tied it fast in, the which pipe was stopp'd very close, and brought over the skin again till we had prepared the other sheep, as follows, viz. We laid bare the jugular vein about the same distance as before, rather more, and made a ligature at either end, with a riding-knot; then on this side of each knot (having made apertion) we put in a brass pipe, both tied very fast in, and close stopp'd. Then we ordered the position of the sheep, so as we might conveniently plant other pipes (which were of quills) to convey the blood from the artery of the one sheep to the vein of the other, which does immediately flow, upon the slipping of the riding-knots, the recipient sheep being placed a little lower than the emittent, and the position kept steady. Then we presently slit the riding-knot also of the upper part of the jugular vein, and received blood from thence, proportionably to what was admitted into the lower part of it, or near it: We did take away by the upper part of the vein between four and five pints according to guess; about which time the emittent grew faint, which made the owner very earnest to kill it the usual way; which he did, but could not get half a pint of blood, and upon opening the same sheep, confessed, he never saw mutton look whiter in his life. The other sheep, which was the recipient, seem'd as well as if she had been unconcerned in the experiment. We staid also to see her killed too, and she bled at the rate as is usual, and as much in quantity.

"We repeated the same experiment the last Wednesday before the society, upon a small bull-dog and a spaniel, much after the same manner, as many of you were eye-witnesses: only we were more exact in the performance, by letting the mastiff bleed into the spaniel till the mastiff died: And we took account, as near as we could, by weighing the blood taken from the spaniel, which we reckon'd was sixty-four ounces or thereabouts. The spaniel was next morning very well and brisk, and so continues."

It was order'd, that the experiment of exchanging the blood of animals be prosecuted and improved by bleeding a sheep into a mastiff, and a young healthy dog into an old and sick one, & *vice versa*; and that Mr. KINO be desired to continue his assistance therein.

The spaniel, which in the late experiment had received the blood of a bull-dog, was produced and found very well.

* Register, vol. iii. p. 179.

Mr. Hooke's account of inclining pendulums was read, and order'd to be register'd*, as follows :

" There are two things chiefly to be consider'd in the motion of a pendulum ; the one is the velocity of the motion in each vibration, and the other is the equidurancy or equality of duration of the vibrations of the same pendulum, tho' of very differing arches.

" As to the first, the determination of the velocity of the vibration depends on the proportion between the quantity of strength, and the bulk of the body to be moved ; wherever the proportion of strength is greater to the proportion of the bulk, there the motion is swifter, and where less, there slower. In all pendulous motions, the strength moving is gravity, and that is more or less, according as it moves the body more directly or obliquely towards the center of the earth.

" As to the second consideration, the equality of duration of vibrations of differing arches or lengths depends upon the figure of the curve-line, in which the body is moved ; which figure being for a great part very near the same with that of a circle, it follows, that the motion in differing arches of the same circle will be very near of equal duration.

" Now this equation depends on the proportion of the length of the intercepted arches to the length of the perpendicular lines of attraction terminating those arches, that is, (to avoid multiplicity of defining words) on the proportion between the lengths of A B, A B, A B, to the lengths B C, B C, B C, &c. Now, if those proportions be, as of a series of roots, to a series of squares, the vibrations of differing arches shall be of equal duration. Now the proportion of arches to the bounding perpendiculars, or (which is all one) to the corresponding versed lines, being very near the same, the vibrations in differing arches of the same pendulum are very near of an equal duration.

" This being premised, I say, that the vibrations of an inclining pendulum in differing arches shall be very near also of equal duration : For in all circular motions in an inclining plane, the proportion of the intercepted arches to the perpendiculars shall be very near, as of a series of roots to a series of squares : Or, which is sufficient to our present purpose, the intercepted perpendiculars shall be to one another, in the same proportion with that of the versed lines of those intercepted arches : therefore the vibrations must necessarily be of an almost equal duration.

Let F A or G A represent the inclination of an oblique pendulum, 'tis evident, that the parts F H, F H, F H, &c. are to F A, and G I, G I, G I, &c. to G A, as E D, E D, E D, &c. to E A. But these are in proportion, as the sine-complements of arches increasing by an arithmetical proportion, from

* Register, vol. iii. p. 165.

the lowest point A: therefore the arches corresponding to the aforesaid divisions of AF and AH, shall be in arithmetical proportion, and consequently also, the perpendiculars from those points H, H, H, &c. and I, I, I, &c. to the horizontal line AC, shall be the same with the lines AD, AD, AD: That is the perpendicular lines of gravitation or attraction answering to the several arches in an inclin'd plane, shall be to one another, as the perpendicular lines of attraction or gravity are to one another in a perpendicular pendulum, which was to be demonstrated.

“How to determine the time, according to the several inclinations, I shall demonstrate in my next.”

Mr. HOOKE shewed the society another kind of pendulum, which being perpendicular and short, by counterpoising performed the part of a long one.

The president was of opinion, that the circular pendulum, as far as he yet saw, was the best of all kinds, of which he had hitherto made trial.

There were delivered to Mr. AUBREY the printed inquiries in n^o 17 and 18 of the *Philosophical Transactions* about the observing of tides, which he undertook to recommend to his acquaintance at Chepstow for observation.

It was ordered, that the secretary should desire those, who were formerly charged with reading and considering Mr. HEVELIUS's second book of comets presented by him to the society for their judgment upon it, that they would bring in their reports.

Dr. POPE shewed the society some grains of wheat, which, he said, were of those 2600 grains, that had been, as the lady HILLIARD had affirmed them to him, produced in Surrey at once out of one grain, shooting up into a straw not hollow, but like a rush. Several of the members took each a single grain to plant for trial, viz. the earl of KINCAIDIN, Sir ROBERT MORAY, Mr. HOSKYNs, Mr. AUBREY, and Mr. KING.

Dr. CROUNE promised to bring his chariot at the next meeting, who owed the society likewise an account of the whitening of wax, and the making of verdigrise.

The lord bishop of Exeter was by the president nominated and deputed vice-president, but not sworn again, having been sworn formerly.

Monfr. SORBIERE was voted to continue a member of the society, the major part of the fellows present at the last assembly consenting, that it should be so, and the charter not having provided a certain number for ejection.

November 27. At the meeting of the COUNCIL were present

The lord bishop of Exeter, vice-president	
Sir ROBERT MORAY	Mr. COLWALL
Sir ANTHONY MORGAN	Mr. PALMER
Sir GEORGE ENT	Mr. CREED
Dr. WILKINS	Mr. OLDENBURG.

The council considered of the persons, who were most likely to attend the business of the council for the year ensuing.

It was ordered, that Mr. OLDENBURG attend Mr. HENRY HOWARD of Norfolk at Arundel-House, and acquaint him with the sense, which the Royal Society had of his great civilities and respects to them, which they intended also to acknowledge publicly, when he should honour them with a visit at a meeting of the society: And

That at the next council it should be considered, where the society should meet for the future, Gresham-College being by reason of its too great distance from the habitations of the greatest number of the society very inconvenient to meet in, especially in the winter season.

Mention was made of hiring a house somewhere in the city of Westminster; and Dr. WILKINS offered to contribute something towards it, if he might have some rooms in it.

November 28. At the meeting of the SOCIETY,

Mr. HENRY HOWARD^a of Norfolk, was elected and admitted, who also received the public thanks of the society for his respects to them.

Mr. HOOKE produced a new kind of level, by including a large bubble of air in a glass-pipe, having its sides exactly blown, and filled with water, and sealed up at both ends. He was ordered to bring in its description and manner of application to practice.

He produced likewise a new kind of back-staff for taking altitudes; as also an augre or instrument to take up earth with; of both which he was also ordered to give in a description and the manner of using them.

Mr. POVEY presented the society with several curiosities brought from the West-Indies, viz. several very curious crab-shells, both white and red; a great piece of crystal less transparent than other crystal; a collar of teeth, such as are worn by the princes of those countries; and a weapon of very heavy wood, used by their commanders.

Mr. OLDENBURG produced some rarities left with him by two of Sir WILLIAM STROUD's sons, viz. a small piece of perfect natural gold, affirmed by them to

^a Afterwards duke of NORFOLK.

have been found in the lead mines of Devonshire, of which kind their father had formerly sent a little box full to the King; and an odd excrescence out of the top of a vegetable called *bit*, resembling lettuce, overspread on both sides with curious plants growing on them.

Mr. KING presented a perfect fœtus, which had died soon after it was born; half of which he had dissected, preserving the whole in spirit of wine.

Mr. HOSKYNs presented a kind of locust, which he said was given him by a merchant, who affirmed it to have been sent from Teneriffe.

Mr. HOOKE produced a substance, which he called the eggs of a ray-fish: Which and the other presents were ordered to be put into the repository.

Dr. WALLIS gave the society some account of what he had lately observed in Kent about tides, viz. that, according to his hypothesis, the tides had been very high about Romney-marsh, three days after the new moon on the 20th day of October preceding; which though the seamen there ascribed to the high winds, as not thinking of any other cause, yet he thought it might be imputed to the cause assigned in his theory; especially if upon continued observations for several years together it should happen in the same manner; and that the high winds, if constantly accompanying such high waters, might be ascribed to the same cause.

The experiments appointed for the next meeting were a new kind of watch, and optic glasses upon new principles, to be produced by the curator Mr. HOOKE.

November 30. On this day of the anniversary election there was first made a report from the committee appointed to examine the accounts of the treasurer, as follows:

“ At a committee for auditing the accounts of DANIEL COLWALL, esq; treasurer
“ of the Royal Society, November 21, 1666,

“ It appears, that Mr. COLWALL is D’

	l.	s.	d.
“ To arrears due to the society for their quarterly payments to and “ for Michaelmas 1666	866	1	0

“ To monies received for admissions	22	11	0
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“ To monies received of Mr. BALLE for the magnetical instruments	20	0	0
--	----	---	---

“ To money received the balance of Mr. HILL’s account	34	2	8
---	----	---	---

942	14	8
-----	----	---

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" Of which it appeareth he hath received upon the quarterly pay- " ments	240	5	6
" For admissions	22	11	0
" Of Mr. HILL the balance of his account	34	2	8
" Of Mr. BALLE for the magnetical instruments	20	0	0
	316	19	2
" And that there resteth unpaid by the fellows of the society	625	15	6
	942	14	8
" It also appeareth, that Mr. COLWALL is creditor			
" By monies paid to the use of the society, as by the particulars is } " made out	143	16	10
" By money put in the chest by order of the council	100	0	0
" By balance now resting in his hands	73	2	4
	316	19	2
" And by arrears yet unpaid	625	15	6
	942	14	8

" Examined and approved of by us

" WALTER POPE

" JOHN AUBREY

" EDMUND KING."

After which the society proceeded to election, at which there were present, at first, forty members, who balloted the eleven to continue in the council; which done, there were found forty-two (two more being come) who elected the ten new ones.

The eleven continued were

The lord viscount BOUNCKER
The earl of NORTHAMPTON
The lord bishop of EXETER
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE

Dr. WILKINS
Dr. GODDARD
Mr. PALMER
Mr. COLWALL
Mr. OLDENBURG.

The

The ten new ones chosen in were

Mr. HENRY HOWARD of Norfolk
Sir WILLIAM PETTY
Mr. HENSHAW
Dr. CLARKE
Dr. MERRET

Dr. CHRISTOPHER WREN
Mr. HOSKYNs
Dr. CROUNE
Dr. BALLE
Dr. POPE.

The same president, treasurer and secretaries, who had served the society the last year, were re-chosen for the year ensuing.

Of the new-chosen members of the council were sworn Dr. WREN, Mr. HOSKYNs, Dr. POPE, and Dr. BALLE; the rest being absent.

It was ordered, that a council should be summoned to meet on the Tuesday following at three in the afternoon, at the president's house.

December 4. At the meeting of the COUNCIL were present

The lord bishop of EXETER,	vice-president
The earl of NORTHAMPTON	Dr. WREN
Mr. HENRY HOWARD of Norfolk	Mr. COLWALL
Sir ROBERT MORAY	Mr. HOSKYNs
Mr. AERSKINE	Dr. POPE
Mr. PALMER	Mr. OLDENBURG.
Dr. WILKINS	

Mr. HENRY HOWARD was sworn of the council.

Dr. WILKINS moved, that Mr. HOOKE might be considered as to the payment of some money, which he thought due to him from the society. But the orders concerning that business not being yet extracted out of the Journals, it was referred to the next meeting of the council.

Sir ROBERT MORAY moved, that the council would take care of supplying the defects of the charter of the society: Which motion being approved of,

It was ordered, that the president, earl of NORTHAMPTON, Mr. HOWARD of Norfolk, Sir ROBERT MORAY, Mr. AERSKINE, Mr. PALMER, Dr. WILKINS, Dr. GODDARD, and Mr. HOSKYNs, or any three or more of them, be a committee to consider, both of the particulars, wherein the charter may be defective, and of the remedies thereof; and that they meet for that purpose at Sir ANTHONY MORGAN's lodgings on Thursdays in the afternoon about four of the clock, and make report of their proceedings from time to time to the council.

Sir ROBERT MORAY proposed, that the council would take into consideration, how the experiments at the public meetings of the society might be best carried on;

on; whether by a continued series of experiments, taking in collateral ones, as they were offered, or by going on in that promiscuous way, which had hitherto obtained.

This was left to farther consideration at the next meeting; as also whether the experiments for propagating motion, and the magnetic ones, should not be prosecuted by the society, though Monfr. HUYGENS and Mr. BALLE had engaged themselves particularly, the one in those of motion, the other in those of the magnet. In the mean time the secretary was directed to consult the Journals, to see what had been ordered concerning this particular.

As to the experiments of transfusion there were suggested several; to try mutual transfusion between old and young, sick and healthy, and that both of the same and of different species. In particular it was suggested, that it should be tried upon a mangy and a sound dog, a young and an old horse; and upon a diseased horse and an ox or cow, to bleed the cow, to be killed, into such a horse.

The earl of NORTHAMPTON and the lord bishop of EXETER were desired to speak to the duke of BUCKINGHAM, that he would accommodate the society with some rooms in York-house for their meetings; which they promised to do.

December 5. At the meeting of the SOCIETY,

PAUL RYCAUT esq; was proposed candidate by Mr. HENRY HOWARD of Norfolk.

It being intimated, that the said Mr. RYCAUT was to go into Turkey, and offered his service to the society in inquiring into philosophical matters, it was ordered, that the secretaries should get ready, both a copy of the general inquiries for all countries, and of such particular ones, as were proper for Turkey; which last were recommended to the consideration of Mr. HOSKYNs and Mr. OLDENBURG.

Mr. BOYLE promised to communicate at the next meeting the particulars, which he had thought upon for the prosecuting and improving the experiment of bleeding animals into one another.

It was desired also, that others would consider the importance of this experiment, and suggest things to be tried accordingly.

Sir ROBERT MORAY mentioned a new kind of level contrived by Dr. CHRISTOPHER WREN, which Mr. HOOKE was ordered to get made as soon as he could; adding to it the way to determine, how much it varied from the level.

Mr. HOOKE produced a new sort of pendulum made after the manner of a beam, and so contrived, that by placing the beam nearer or farther below the center of motion, the pendulum may perform its vibrations in any time assigned; in which
he

he affirmed to be one certain depth, beyond which the pendulum would not go quicker, which he had not yet reduced to a theory, but hoped to do it.

He having mentioned likewise his contrivances of two instruments, the one for fetching up earth from the bottom of the sea, the other for fetching up the several sorts of earth out of the ground on the land, was ordered to get them both made with speed.

The experiments appointed for the next meeting were,

1. The bleeding of a sheep into a dog; the curators of which were to be Dr. POPE, Dr. KING, Mr. COXE, and Mr. HOOKE, who were to perform it first by themselves in private.

2. Mr. HOOKE's new principle of making optic-glasses.

Decemb. 12. Mr. RYCAUT was elected and admitted.

The experiment, which was ordered of bleeding a sheep into a dog of the kind of curs was made; which succeeded pretty well, though not so well as that, which had been made at the meeting of Novemb. 21, by reason, as it was supposed, of the frosty weather causing more coagulation in the blood. In the mean time Dr. KING reported to the society, that on the Monday before, the like experiment had been tried in private with very good success, at which were present Dr. POPE, Mr. DANIEL COXE, Mr. THOMAS COXE, Mr. OLDENBURG, and Mr. HOOKE.

It was ordered, that at the next meeting this experiment should be tried upon a mangy and a sound dog, letting the blood of the former into the veins of the latter; and that Dr. BALLE, Mr. DANIEL COXE, Mr. THOMAS COXE, and Mr. HOOKE should take care of the experiment.

Mr. BOYLE moved, that the animals might be weighed before the operation; and that the transpiration, made in so short a time as that work lasted, could not be considerable.

Mr. POWLE gave an account of some observations concerning tides, which he promised to give in more largely in writing before he went out of town.

Sir PAUL NEILE moved, that those, who were employed to observe high tides, might be desired to observe, whether they are constantly accompanied with high winds.

Dr. WREN's level being called for, it was produced ready made, and ordered to be described.

Some

Some inquiries for Turkey drawn up by Mr. HOSKYNs and Mr. OLDENBURG were read, and ordered to be registered', and a copy of them to be delivered to Mr. RYCAUT.

Decemb. 19. Monfr. LE FIGURE the younger was proposed candidate by Sir ROBERT MORAY.

Mr. HOOKER proposed a new clock-work, and a new bucket to fetch up earth from the bottom of the sea, and promised to bring them in both at the next meeting.

He was also put in mind of his new way of making optic glasses, formerly proposed by him.

It was ordered, that at the next meeting the experiment be made of transfusing the blood of a found dog into a mangy one; and that the operator provide necessaries for it, to begin the operation about twelve o'clock that day.

Mr. BOYLE suggested, that it might be considered to make an estimate of what proportion of blood is let out.

Dr. POPE moved, that a trial might be made of letting out half the blood of a dog, and of supplying it with warm milk, or, because milk may coagulate, with a liquid of barley-cream.

Mr. BOYLE mentioned, that not only care must be had of the kind of liquor to be injected, but also of the manner and place of the injection; in default whereof the liquor would drive the blood before it to the heart, and by too great abundance crowding in there kill the animal. To avoid which, it might be injected by degrees, and in the remoter parts from the heart, as in a crural vein.

Dr. GODDARD moved to try the bleeding of a dog almost to death, and to let in blood again, to see whether he might be restored that way.

There were read two papers concerning tides, one of Mr. POWLE, the other of Mr. SAMUEL COLEPRESE, who both offered their service for continuing and communicating their observations. Their papers were ordered to be kept for enlargements.

Sir PAUL NEILE suggested, that it might be recommended to some person, who had opportunity for it, to observe, whether at the same hour it was high water at the new and full moon upon all the capes of the south-west coast of Ireland. This was recommended to Mr. BOYLE, who undertook the recommending of it; but desired, that this and the like particulars might be given him in writing. Sir ROBERT MORAY and Mr. OLDENBURG were desired to draw them up, and deliver them to Mr. BOYLE.

* They are printed in the Philof. Transact. vol. i. n° 20. p. 365. for Dec. 1666.

Sir

Sir ROBERT MORAY was also desired to procure observations of the course of tides upon the north-west islands of Scotland; which he undertook to do.

He and Mr. OLDENBURG were desired to obtain the history of the tides of the British coast of France.

Mr. BOYLE moved, that the course of the tides of the straits of Magellan might be inquired into.

Mr. HOOKE took notice, that he had observed, that between Portsmouth and the Isle of Wight from half flood to high water, and so to half ebb, it runs from west to east, and again from half ebb to low water, and so to half flood again, it runs from east to west.

Decemb. 21. At the meeting of the COUNCIL were present

The President

The lord bishop of EXETER
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. PALMER
Dr. WILKINS

Dr. WREN
Dr. POPE
Dr. BALLE
Mr. OLDENBURG.

It was ordered, that Dr. WILKINS write a letter from the council to the earl of SANDWICH, giving him thanks for his respects to the society, and his care of making celestial observations; excusing also the omission of corresponding with him from England in such observations; and annexing the particulars of the late solar eclipse observed at London, Paris, and Dantzick, and some experiments newly made in the society:

That the accounts concerning Mr. HOOKE be stated by the treasurer, that it may appear what the former had already received, and what yet remained due to him, according to the several orders formerly made by the council; and that thereupon the treasurer pay Mr. HOOKE what should thereby appear remaining due to him:

That the sum of forty pounds be presented by the treasurer to Mr. OLDENBURG, for the great pains, which he had taken in behalf of the society:

That Mr. HOOKE be desired to promise by his hand-writing to observe the ends, for which the report from Sir JOHN CUTLER entered in the journal-book of the society, Nov. 9, 1664, affirms the fifty pounds a year to be given him by Sir JOHN: and

That the president be desired to draw up a form for such a promise to be subscribed by Mr. HOOKE.

Decemb.

Decemb. 27. At a meeting of the COUNCIL were present

The President

The lord bishop of EXETER
Mr. HENRY HOWARD
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. AERSKINE
Dr. MERRET

Dr. CLARKE
Dr. WREN
Mr. COLWALL
Dr. BALLE
Mr. OLDENBURG.

Dr. MERRET and Dr. CLARKE were sworn members of the council.

It was ordered, that the operator, RICHARD SHORTORAVE, do for the future bring no bill of work done for the society without some avoucher, who shall be a curator of the respective experiments, about which he shall have been employed: and that without such an avoucher, no account of the said operator shall pass in council: with which order he, being called in was made acquainted: and

That Sir PAUL NEILE and Mr. OLDENBURG be added to the committee appointed on the 4th of Decemb. for considering of the supplemental charter; and that the same committee, upon the occasion of Mr. PALMER's death, take into their consideration the statute concerning the manner of electing a new member into the council in case of vacancy, in the interval of the anniversary elections.

January 2, 166⁵, at a meeting of the SOCIETY,

Mr. HENRY HOWARD of Norfolk presented the society with the library of Arundel-house¹, to be disposed thereof by them as their property, desiring only, that in case the society should come to fail, it might return to Arundel-house; and that this inscription *ex dono HENRICI HOWARD Norfolciensis* might be put upon every book given them; he allowing also the liberty of changing those books, that were double, or such as were not for the society's purpose, for others; which exchanged books were to be marked likewise with the same inscription.

The society received this noble donation with all thankfulness, and ordered, that Mr. HOWARD should be registered as a benefactor.

Mr. HOOKE brought in the formerly proposed bucket for fetching up earth or any other solid body from the bottom of the sea. It was ordered, that care should be taken so to fit it, that the springs might go off both together, and that easily and

¹ This library had been purchased by Mr. HOWARD's grandfather, THOMAS earl of Arundel, during his embassy at Vienna. It had formerly been part of that of MATTHEW CORVINUS king of Hungary, erected by him at Buda in 1485;

and after his death in 1490, it came into the possession of the famous BILIBALDUS PIRCKHEIMERUS of Nuremberg, who died in 1530. It contains, besides a great number of printed books, many rare and valuable manuscripts.

certainly

certainly, and when it meets with soft ground, as well as hard; as also to grate it over.

He likewise brought in a new clock-work, so regulating and adjusting a circular pendulum, that at the end of a certain number of vibrations, the clock-motion should be reduced to an exactness, which it had not before. He was ordered to perfect it, and to bring in a full description of its structure and use in writing.

Mr. OLDENBURG produced two small printed books sent to him from Paris, one written in Latin, intitled, ISMAELIS BULLIALDI *ad astronomos monita duo*; *primum de stellâ novâ, quæ in collo ceti ante annos aliquot visa est*: *alterum de nebulâ in Andromedæ cinguli parte boreali ante biennium iterum orîdâ*: the other in French by Monfr. PAVEN, intitled, *Selenelion*. The former was recommended to the perusal of the lord bishop of EXETER, the latter to that of Mr. HOOKE, to whose view the author also had particularly designed it.

It was ordered, that the experiments of transfusing blood be prosecuted, when the summer-weather came in.

Sir ROBERT MORAY mentioned, that one capt. BLACK was lately come from the East-Indies, who was capable of giving a good account of those parts, and particularly of Japan and China, having lived there many years. It was ordered, that Sir ROBERT and Mr. OLDENBURG should desire him to impart an account of the observables, which he had met with in those countries.

The experiments appointed for the next meeting (besides the perfecting of the two instruments abovementioned) were

1. A new kind of weather-glass, to try all degrees of heat in, viz. what degree will melt such and such bodies.
2. An instrument to apply the strength of powder to the bending of springs securely and certainly, both by Mr. HOOKE.

The inquiries for the western coast of Ireland, ordered in the former meeting to be drawn up by Sir ROBERT MORAY and Mr. OLDENBURG, were produced and delivered to Mr. BOYLE, viz.

1. At what hour it is high water on the day of the new and full moon upon every cape and bay of the western coast of Ireland.
2. How long after the new and full moon the highest spring-tides will be.
3. What are the perpendicular heights of the flood, both at the ordinary and spring tides.

January 4. At a meeting of the COUNCIL were present
Vol. II. T

Sir

Sir ROBERT MORAY vice-president

Sir PAUL NEILE

Mr. COLWALL

Mr. AERSKINE

Mr. HOSKYNs

Dr. WILKINS

Dr. BALLE

Dr. WREN

Mr. OLDENBURG.

It was ordered, that the following form, for notifying, that the meetings of the society be henceforward at Arundel-house, be printed, viz.

“ These are to give notice, that the weekly meetings of the Royal Society are appointed to be at Arundel-house on Wednesday next, being the 9th of this present January 1666, and thenceforward on the usual day and hour.”

It was ordered likewise, that Mr. HOSKYNs, Dr. BALLE, Mr. OLDENBURG, and Mr. HOOKE be a committee for causing a catalogue to be made of the library of Arundel-house; and that the amanuensis and operator from time to time attend this committee, which was to begin to meet on the Thursday following in the said library: and

That Mr. HOOKE attend Dr. WILKINS about reducing the extracts of the society's journal-books into a method for Mr. SPRAT.

January 9. The society meeting the first time in Arundel-house, the president took notice again of the great favour, which Mr. HENRY HOWARD of Norfolk had shewn to the society, not only in accommodating them with convenient rooms for their meetings, but also in presenting them with the library of the said house.

THOMAS LAKE esq; was proposed candidate by Mr. HAYES.

Dr. MERRET presented the society with his book intitled *Pinax Rerum Naturalium Britannicarum, continens vegetabilia, animalia, fossilia, in hac insulâ reperta, inchoatus*, printed at London.

He produced some observations of his concerning the uniting of the barks of trees cut to the tree itself; as also an experiment on *alcœ Americana serratisolia* weighed: which papers were ordered to be registered.

It being pressed by Mr. OLDENBURG, that an account might be brought in of Mr. HEVELIUS's book concerning his justification of what he had written of the first comet, and his description of the second, the president exhorted those, to whom the perusal and examination of that book had been committed, to hasten the bringing in an account thereof in writing.

* Register, vol. iii. p. 172, 173. They are and 455. for May 1667.
printed in Philos. Transact. vol. 2. n° 25. p. 453.

Sir

Sir PAUL NEILE renewed his former motion for observing the sun's figure at his rising and setting both at Greenwich and Whitehall, or Kensington, or Chelsea. Mr. EVELYN and Mr. HENSHAW undertook the observing it at the setting of the sun for several evenings together.

Mr. OLDENBURG read an extract of Monsr. AUZOUT's letter to him from Paris Decemb. 28, 1666, N. S. * mentioning a new method esteemed by him better than any hitherto practised, of taking the diameters of the planets to seconds, and of knowing the parallax of the moon by means of her diameter.

Dr. WREN and Mr. HOOKE having related to the society several ways, which they had known long before, of taking the diameters of the planets to seconds, were desired briefly to describe them, that so it might be signified to the Parisian philosophers, that it was a thing not at all new among the English.

Mr. HOOKE renewed his former proposal of observing the parallax of the earth's orb; which he was exhorted by the president to do with all convenient speed †.

There was again produced the bucket for fetching things from the bottom of the sea. It being not yet altered, as had been directed at the preceding meeting, it was ordered to be perfected against the following one.

The new clock-motion for adjusting the circular pendulum was also ordered to be perfected against the next meeting.

The experiments appointed for the next meeting were,

1. That of applying the strength of powder to the bending of springs.
2. A new kind of weather-glass to try all degrees of heating.

January 16. There were presented a brace of the birds called *Coccyzoides*, a male and female, the male being distinguished from the female by a black spot, which the male had under his jaw.

Col. BLOUNT mentioned, that he had a bird, of which he knew not well the species, promising to bring it to the society.

Dr. CROWE produced his chariot, which was examined and approved for being plain, light, and easy, but thought somewhat weak; for which defect a remedy was suggested by underlining with cordage the board, upon which the body of the chariot rested. He was desired to bring in a scheme of it, with a full description of

* Letter-Book, vol. i. p. 370. It is printed in the Philof. Transact. n^o. 21. p. 373, for January 1666.

† The result of his observations was afterwards

published in his *Attempt to prove the rectitude of the earth from observations*, printed at London 1674 in 4^{to}, being the first of his *Cutlerian lectures* published.

its structure and conveniencies; which was also desired to be done by those, who had formerly brought in models of chariots, as Col. BLOUNT and Mr. HOOKE.

Col. BLOUNT mentioned, that he had now a way of making such a chariot, wherein ease, security and strength were found together; which he was desired to produce at Arundel-house.

Mr. HOOKE shewed a metal, which he said was a preparation of mercury fit to take off any impression of a seal or medal, &c. and to enlarge or lessen the same, keeping its proportions, and then to grow hard again after two or three hours time. He tried it before the society with some success, by softening the hard metal with the pressure and working of a knife, and by taking off impressions. He was desired to perfect the experiment.

Dr. CROUNE produced two letters written to him by Mr. STENO from Florence, Dec. 4, 1666; one of which signified, that he had written elements of the structure and motion of the muscles, demonstrating, that the construction of the muscles is performed by thrusting: The other mentioned two experiments made with mercury, one to shew, that the cane containing the water and quicksilver being inverted, there issued something out of the mercury, that enters into the void space in the top of the cane; the other, to make appear the equilibrium of the air with the mercury, by a way different from that, which is ordinary. To which was added an account of an experiment of freezing with a mixture of ice and brandy. An extract was ordered to be made of these letters.

Mr. BALLE having sent the apparatus magneticus belonging to the society, Mr. HOOKE was ordered to take care of and to register it.

It was mentioned by Mr. OLDENBURG, that the council had thought fit, that the experiments for making out a theory of the laws of motion formerly begun by Dr. WREN, Dr. CROUNE, and Mr. HOOKE; as also those about the magnet formerly begun by Mr. BALLE and Mr. HOOKE, should be prosecuted. The society hereupon desired Dr. WREN to give in those experiments of motion devised by himself; but he alledging, that the account of them was at Oxford, Dr. CROUNE and Mr. HOOKE were desired to bring in theirs; as also, that Mr. HOOKE should prosecute the experiments of the loadstone.

Dr. WREN and Mr. HOOKE were again desired to communicate their methods of taking the diameters of the planets to seconds.

Dr. WREN was put in mind of the telescopical moon formerly promised by him.

The members, who had undertaken the examination of Mr. HEVELIUS's book on the comets, were likewise put in mind of bringing in an account thereof.

The experiments appointed for the next meeting were,

1. To have perfected the circular pendulum lately exhibited :
2. The engine for applying gunpowder to the bending of springs :
3. To have the bucket for fetching up of things from the bottom of the sea compleated.

January 17, At a meeting of the COUNCIL were present

The President

Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Dr. WILKINS

Mr. HOSKYNs
Dr. BALLE
Dr. CROUNE
Mr. OLDENBURG.

Dr. CROUNE was sworn member of the council.

It was ordered, that the form, drawn up by the president, of the promise to be made by Mr. HOOKE for observing the ends, for which (according to the report of Nov. 9, 1664) the fifty pounds *per ann.* were given him by Sir JOHN CUTLER, be delivered to the said Mr. HOOKE; which was accordingly done. The form was as follows :

“ Whereas upon consideration, that Sir JOHN CUTLER, knight and baronet,
“ hath settled upon me fifty pounds *per annum* during my life, I have promised and
“ undertaken to read in the vacation times in Gresham-college, or in such other
“ place, as the Royal Society shall meet in, sixteen lectures *per annum*, in order to
“ the advancement of art and nature, the said society having been desired to direct
“ the particular matter of the said lectures by reading one, each week, during the
“ so many weeks successively, next after each of the four usual terms in the year,
“ as were weeks in the then last preceding term, upon such day of each week, as
“ the said Royal Society shall meet upon; I do hereby renew the said promise, and
“ undertake to read the said lectures upon such particular matters, as the said society
“ shall direct. In testimony whereof I have hereunto set my hand and seal.”

It was ordered, that a copy of the said report, as also of the thanks, that were to be returned to Sir JOHN CUTLER, be forthwith made and delivered to Sir ROBERT MORAY or Sir PAUL NEILE, to give it the lord bishop of EXETER, to shew it to the said Sir JOHN CUTLER, that he might declare, whether it was really his intention to intrust the society with the management of the fifty pounds given by him to Mr. HOOKE.

The letter to be sent from the council to the earl of SANDWICH at Madrid was signed by the president and council.

The council approved of the particulars for the supplemental charter of the society; as also of the alteration in the statute for electing a new member in the council,

council, in case of vacancy, in the intervals of the anniversary elections. The heads of particulars for the charter were as follow :

1. That the power in the president of substituting one vice-president may be enlarged to the substituting as many vice-presidents at one and the same time, as to the president should seem meet : and that all the clauses in the charter any way relating to the vice-president may be made to relate to each of such vice-presidents respectively.

2. That the several powers, which cannot be exercised but by the president and council, or seven or more of them, may be exercised by the president and council, or five or more of them.

3. That the authority of meeting within London, or ten miles of it, may be enlarged to all England.

The council licensed N^o 21 of the *Philosophical Transactions*, Mr. MARTYN having undertaken again the printing thereof, as being somewhat resettled after the late fire of London^a.

January 23. At a meeting of the ROYAL SOCIETY,

The experiment of bending a spring by the force of gunpowder was tried three times without success, and the fourth time it succeeded. It was ordered, that it should be repeated at the next meeting, and that particularly a weight should be wound up by a shot of gunpowder, to see for example, what force would wind up an hundred pounds weight.

It was observed, that the stroke of gunpowder was so brisk and sudden, that it would break any thing ; and that therefore little powder should be used.

Col. BLOWNT produced a draught of his chariot, and was desired to bring in the model itself at the next meeting, which he promised to do.

He produced likewise a live grey gull, in Latin *Larus cinereus*, which lives upon flesh and boiled corn.

^a Mr. MARTYN and Mr. ALLESTREE, the printers of the Royal Society, and the book-sellers in St. Paul's Church-yard, lost their stock of books in that fire, after removing them from their own houses into St. Faith's church under St. Paul's ; and among these were all the copies then printed and unfold of the *Philosophical Transactions*. See Mr. OLDENBURG's letters to Mr. BOYLE of Sept. 10, and 18, 1666, in Mr. BOYLE's works, vol. v. p. 358. He complains in another letter of Octob. 23, (p. 362.) that so that very hour he could get none to print the *Philosophical*

Transactions : " and unless, says he, Mr. CROOK (whom I do what I can to encourage to it, by promising him, that I will endeavour the best I can to procure for him the printing some good vendible books, as occasion shall serve) undertake it, I despair of the continuation " N^o 17 was printed after the fire gratis, N^o 18 for October 1666, was accordingly printed for Mr. JOHN CROOK in Duck-lane ; N^o 19 for him and MOSES PITT in Little-Britain ; and N^o 20 for December for MOSES PITT alone.

Dr. CHARLTON mentioned, that two grains of *nux vomica* being given to a finnet killed it, which being thrown to a grey gull, killed that likewise.

Dr. WILKINS introduced Mr. LYTTLETON to be present at this meeting; who offered his service to the society in his voyage to Barbadoes: upon which it was ordered, that a copy be made of the queries for all countries in general, and delivered to Mr. LYTTLETON.

A letter of Dr. WALLIS to Mr. OLDENBURG dated at Oxford January 19, 1666*, was read, containing his thoughts of Mr. HEVELIUS's *Mantissa* and some considerations about tides.

Mr. HOOKE was ordered to bring in something in writing relating to the controversy between Mr. HEVELIUS and Monf. AUZOUT, which might import, that upon examination of the observations made in England, and compared with those made in other parts, the society was inclined to believe, that Mr. HEVELIUS had been mistaken.

Mr. HOOKE affirmed, that the altitude of the sun or other stars might be taken with a single six foot telescope put perpendicular, without any refraction or parallax, and that in the space of two or three minutes: which was ordered to be tried, and the success and way of doing it to be registered.

He affirmed likewise, that the circumference of the earth might be measured to seconds by a sixty foot glass put perpendicular, a place being given, where the distance may be conveniently measured, such a one as may be smooth and a mile long, lying north and south, or at least north-east and south-west. He was ordered to make this experiment as soon as a place could be found convenient for it.

The making of a telescopical moon being again insisted upon, it was ordered, that the King should be requested by Sir ROBERT MORAY to lend that in his closet; and that Dr. WREN should employ a fit person to cast it upon a bigger globe; which being done, it might afterwards be perfected by fresh observations of the moon.

The instrument for bringing up things from the bottom of the sea being again mentioned, Mr. HOOKE took notice, that this, as it then was, having been tried, could bring up things only from a small depth; but that he would try other ways for greater depths.

He affirmed, that Venus had lately appeared to him in a twelve foot glass as big again as the moon to the naked eye; adding, that he never saw her so sharp, and that she was very near the sun, with whom she would be in conjunction within a very few days.

* Letter-Book, vol. i. p. 375.

January 25. At a meeting of the COUNCIL were present

The President

The earl of NORTHAMPTON
Sir ROBERT MORAY
Dr. WILKINS
Dr. WREN
Dr. BALLE

Mr. COLWALL
Dr. CROUNE
Dr. POPE
Mr. HOSKYNs
Mr. OLDENBURG.

The council having considered the greater conveniency of the society's meeting on Thursdays than Wednesdays, resolved, that the fourth chapter of their statutes, which appointed the ordinary meetings of the society to be on Wednesdays, should be repealed: and

That at the next meeting of the council the following draught for the society's meeting on Thursdays hereafter be presented, viz.

“ The ordinary meetings of the society shall be weekly upon Thursday, beginning about three of the clock in the afternoon, and continuing until six, unless the major part of the fellows present shall for that time resolve to rise sooner, or fit longer: and no fellows shall depart without giving notice to the president.”

It was ordered, that the treasurer pay to the operator (according to statute) the yearly salary of ten pounds from the time, that the payment made to the said operator of twenty shillings a week hath ceased.

Mr. Hooke delivered to the council a paper signed and sealed by him, containing a renewal of his promise and undertaking of reading sixteen lectures a year upon such particular matters, as the society shall direct.

January 30, being the anniversary fast-day, there was no meeting of the society.

Feb. 1. At a meeting of the COUNCIL were present

The President

Mr. H. HOWARD of Norfolk
Sir ROBERT MORAY
Sir PAUL NEILL
Mr. AERSKINE
Mr. COLWALL

Mr. HOSKYNs
Dr. POPE
Dr. BALLE
Mr. OLDENBURG.

It was voted, that the draught, which was voted on the 25th of January to be presented to the next meeting of the council, be passed into a law.

It

It was ordered, that Sir SAMUEL TUKE be written to by the secretary, and desired to send the council an account of Sir KENELME DIGBY's * library at Paris, what kind and number of books it consists of, and what they are rated at : and

That Mr. HOOKE prepare himself to read before the society in Arundel-house at their next meeting-day after this present term.

Feb. 5. At a meeting of the COUNCIL were present

The President

Mr. HENRY HOWARD
Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Dr. CLARKE
Mr. COLWALL

Mr. HOSKYNs
Dr. WREN
Dr. CROWE
Dr. BALLE
Mr. OLDENBURG.

It was voted, that the statute for meeting on Wednesday be repealed : and

That the following draught for a statute now agreed upon about supplying of one or two vacant places of the council be read at another meeting of the council, viz.

“ The eleventh article of the eighth chapter of the statutes of the Royal Society concerning the supplying vacancies of places, which happen in the interval of anniversary elections, shall have place only, where the number of persons to be elected by the fellows of the said society into the council or any office is three or more, and not otherwise. But when there are but one or two to be elected, upon credible notice given to the president or his deputy, for the time being, that any member or members of the council or officer or officers, who ought to be chosen by the fellows of the Royal Society, is or are dead or otherwise removed, and his or their place or places, office or offices, thereby become void, he the said president, or his deputy as aforesaid, shall, at the weekly meeting of the Royal Society, which shall be next after such notice, or so soon as conveniently it may be done, declare to all then and there present, that such place or places, office or offices, is or are become void, and that at the weekly meeting then next ensuing there shall be other or others elected, to supply the said vacant place or places, office or offices ; and at the next meeting after, where there shall one and twenty or more be present, scrutators shall be chosen, as at an anniversary election, and every fellow then present shall deliver to the secretary a scroll or paper folded up, having in it written the name or names of such person or persons, as he, who delivers the said scroll, shall think most fit to supply the said vacant place or places, office or offices : and when all the scrolls are delivered in, they shall be opened, read, and counted, and he or they, that is or are named by the greatest number, and such a number, as by the charter is required,

* He died June 11, 1665.

" shall be declared elected to such place or places, office or offices: And if it happen,
 " that no one person be elected, to succeed in one or both of the said vacant places
 " or offices by a competent number of votes, as by the charter is required, in such
 " case the president or his deputy as aforesaid shall declare, what persons have
 " been named in the said scrolls, and by how many each man has been named,
 " and shall then require the fellows then present to repeat the election in manner
 " aforesaid, and that so often as there shall remain any one of the said places or
 " offices unsupplied for want of a competent number of votes, after the giving in,
 " reading, and counting the scrolls as aforesaid; unless the president or his deputy
 " and the fellows of the Royal Society, or the major part of them then present,
 " shall think fit to adjourn the election to some other time, and then they shall
 " proceed in manner aforesaid."

The president then adjourned the council to meet again on the Thursday following at two of the clock in the afternoon at Arundel-house.

February 6. At a meeting of the SOCIETY,

Mr. Hooke produced a new kind of lamp serving to supply the oil in due quantity, so that as it wafts, there may not rise too much or too little, by a weight, that should always counterpoise the oil, the figure being a half cylinder. The description and demonstration of it were ordered to be brought in by him, as soon as conveniently he could*.

It was likewise ordered, that this vessel should be so prepared for the next meeting, that it might actually serve for a lamp, as it was designed.

The experiment for raising a weight by the force of gunpowder was tried, but the weight was thrown off, instead of being raised.

It was ordered, that Mr. Hooke should think of a way to make it succeed; as also, that he should prosecute the experiment of winding up a spring the same way.

Sir ROBERT MORAY remarked, that in this experiment it was to be considered, how the impetus of the gunpowder might be so ordered, as not to break the bodies tried; and if that could not be done, then to make a compound, which might move strongly enough, and yet slowly.

Mr. BOYLE suggested, that the force of gunpowder might be tried by making it raise a weight of water; by which means, if the vessel were conveniently shaped, the decrement of the force, according as the fired gunpowder would be weakened by expansion, might in some measure appear: as also, that the strength of gunpowder might be tried by the weight of water, which it will expel out of a vessel; by which means might be examined the strength of different powders.

* The description of this lamp is published in his *Lampæ* printed at London 1677 in 4to.

Dr. WREN moved, that this experiment might be tried by laying within a pair of bellows, with a weight upon it, a serpentine line of powder, to make it fire only with such a degree of velocity, that it should break nothing; adding, that if the concussion be made too quick for the vibration of parts, the body tried must break.

He affirmed, that if he might know, how much gunpowder expands, he would tell what weight it raised.

Mr. BOYLE desiring, that the expansion of powder might be examined, it was ordered, that Mr. HOOKS should consider of and draw up such experiments, as might be proper to examine the said expansion.

There were read several letters; one from the earl of SANDWICH to the president, dated at Madrid January 7th, 166 $\frac{1}{2}$, together with three sheets of celestial observations; and the president was desired to let the earl know, that the astronomers, to whom the care of making observations was committed, were likely to observe more for the future than they had hitherto done; and that particularly the observing the spots in the sun was recommended to them.

The second letter was from FERDINAND ALBERT duke of Brunswick, to Mr. OLDENBURG, dated at Wolfenbuttel January 8, 166 $\frac{1}{2}$, containing both his desire to be made acquainted with the experiments made in the society, and his offer of communicating in return what should come to his knowledge in Germany and out of Italy. It was ordered, that the thanks of the society should be returned to his highness, and that his correspondence should be embraced.

The third letter was from Dr. WALLIS to Mr. OLDENBURG dated at Oxford 31 January, 166 $\frac{1}{2}$, containing his farther thoughts concerning Mr. HEVELIUS's *Prodromus* and *Mantissa*; upon which it was ordered, that the president and the lord bishop of EXETER be desired to invite those persons, to whom, besides Dr. WALLIS, the perusal and examination of Mr. HEVELIUS's books had been committed, that they would meet with them at a convenient time, to consider of this account of Dr. WALLIS, and what additions or alterations were fit to be made therein, in order to send an answer to Mr. HEVELIUS.

The same letter of Dr. WALLIS desiring, that some other circumstances, besides these formerly mentioned relating to tides, might be observed, it was suggested by Sir PAUL NEILE, that it might be taken particular notice of, what kind of wind, and from what point of the compass it should blow, when the greatest tides happened to be.

Feb. 14. At a meeting of the COUNCIL were present

[†] Letter-Book, vol. i. p. 380.

The President

The lord bishop of Exeter
 Mr. HENRY HOWARD
 Sir ROBERT MORAY
 Sir PAUL NEILE
 Dr. CLARKE

Dr. WREN
 Mr. COLWALL
 Mr. HOSKYNES
 Dr. BALLE
 Mr. OLDENBURG.

The draught of the statute now agreed upon relating to the supplying of one or two vacant places in the council was voted to pass into a law, as it was entered in the council-book at the preceding meeting of February 5.

It was ordered, that the treasurer pay Mr. HOOKE what appeared to be due to him, upon the balance of his account, now presented, which was as follows :

" The account of monies due to Mr. ROBERT HOOKE, as curator to the Royal Society, is debtor

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" To the first payment of 80 l. <i>per annum</i> , due to him at Midsum- " mer 1664	20	0	0
" To the second quarter's payment due at Michaelmas 1664	20	0	0
" To money due upon the said account of 80 l. <i>per annum</i> from " Michaelmas 1664 to the 23d of November following	11	13	4
" To money due to him by an order of the 23d of November " 1664, at 30 l. <i>per annum</i> to 23 November 1665	30	0	0
" To money due more upon the said order from the 23d of Novem- " ber 1665, to Christmas 1666	32	10	0
	<u>114</u>	<u>3</u>	<u>4</u>

" The said account is creditor

" By monies received by Mr. HOOKE of Mr. HILL on account of " the 80 l. <i>per annum</i>	39	0	0
" By money received of Mr. COLWALL <i>per order</i>	30	0	0
" By the balance resting due to Mr. HOOKE, which the treasurer is " hereby ordered to pay	45	3	4
	<u>114</u>	<u>3</u>	<u>4</u>

It

It was ordered, that the payment of Mr. Hooke for the future be considered of at the next meeting:

That Sir ANTHONY MOROAN be put in mind to draw up the form of the particulars to be added to the charter, and to present them to the council, when he is ready: And

That he be desired to draw up a deed of gift concerning the library presented by Mr. HOWARD to the society.

On the same 14th of February, the SOCIETY began to meet upon Thursday, according to the new statute.

Mr. LAKE was elected.

The president gave notice, that at the next meeting there was an election to be made of a member into the council in the place of Mr. PALMER, deceased.

The lord bishop of EXETER produced a load-stone of sixty pounds weight sent out of Devonshire by Dr. EDWARD COTTON, archdeacon of Cornwall, as a present to the society, with this description in a letter to the bishop dated at Silferton Feb. 6, 1667, that though the load-stone took up no great weight, yet it moved a needle about nine feet distant; and that some part of it being broken off had been also set up, because being put in its proper place it added much strength to the load-stone, it moving not much more than seven feet without that addition*.

It was ordered, that the virtue of the stone be tried at the next meeting, both of the two pieces put together, and of each piece separately.

Sir ROBERT MORAY made mention of a small load-stone lifting eighty times its own weight.

Mr. HENRY HOWARD presented a stone taken out of the dead-sea, burning and stinking. He was desired to procure more of them by the means of Mr. PAUL RYCAUT; which being obtained, it should be examined, whether it does not contain a powerful dissolvent, some of the members judging by the taste, that it held a considerable quantity of sal armoniac.

The lamp brought in at the last meeting was tried and recommended to the care of Mr. CHARLES HOWARD, for observing the manner of its burning.

Dr. WREN mentioning, that he had a new kind of lamp, the operator was ordered to attend him, to receive his instructions how to make it.

* This account is printed in the *Philos. Transact.* vol. ii. n.º 23, p. 423, for March 1667.

He suggested likewise, that there being added to the lamp abovementioned a small socket upon the wick, it would make the wick furnish the oil according to any proportion of time, and to regulate the lamp to be a clock.

This was ordered to be tried.

The experiment of winding up a spring by the force of gunpowder was made by Mr. Hooke; and the success, as he related it, was, that about a grain and a half of powder wound up a spring to the top, which was about four feet high. It was ordered to be tried again at the next meeting.

Dr. Croune's chariot was produced, and generally approved of by the members; only some fence was proposed to be made for the coachman against the kicking of the horses.

Mr. Hoskyns affirmed, that a method had been related to him of making old trees fruitful, by planting some young stocks to the old tree, and by cutting them off when they were fastened and grew well, inserting them, bared about the top, into holes made in the old tree, in such manner, that the bark of the young and that of the old tree may join together; whereby a good quantity of juice would be conveyed to the old stock to renew it, and make it bear.

Mr. Hooke proposed for the next meeting (besides the particulars mentioned above, relating to the addition to the lamp, and the repeating of the experiment of winding up a spring by gun-powder) an experiment improving circular pendulums, by so ordering them, that they shall not vary their motion by more or less appendant weight; which he also undertook to demonstrate.

The operator was ordered to take out and reconvey into a glass, with a narrow mouth, such a frame of wood, as the King had sent a pattern of in a glass.

February 21. JOHN PEARSON, D. D. Master of Trinity-college in Cambridge, was proposed candidate by Mr. MATTHEW WREN.

Sir ANTHONY MORGAN was elected into the council in the room of DUDLEY PALMER, esq; lately deceased.

There were produced by Mr. HOWARD's servants several pictures of Turkish habits (to the number of 16 single and 8 double ones) as well of those of the grand signor and the empress, as of those of their officers and servants. He desired, that they might be put into the library of Arundel-house.

Mr. Hooke produced a circular pendulum so contrived, that its motion should be equal, whatever weight was appended to it. He affirming, that he knew the demonstration of it, was ordered to give it in writing at the next meeting.

He

He was ordered likewise to compare the motion of this circular pendulum with a clock : And

To bring in the description and demonstration of the new lamp, as also to prosecute and improve the experiment of raising weights by the force of gunpowder to a greater height.

The operator was again ordered to attend Dr. WREN to receive his directions for the making his new kind of lamp, and for the addition to Mr. Hooke's lamp mentioned at the preceding meeting.

Mr. OLDENBURG mentioned, that in France Monsr. BULLIALDUS and other astronomers now observed again the new star in the neck of the whale, and were desirous, that the astronomers of other nations might join with them in these observations, to see whether it kept the same analogy of motions and periods, which it had from the year 1638 to 1664, it being manifest from observations hitherto made of this star, that the greater phases thereof every year anticipate by 32 or 33 days.

As to the other star in the girdle of Andromeda, which Monsr. BULLIALDUS thought to appear and disappear by turns, as those in the necks of the whale and the Swan, Mr. HOOKE affirmed, that he had seen it this winter, and several times in the years 1664 and 1665. He was desired to observe carefully both these phenomena.

Mr. BOYLE proposed two experiments,

1. To try the operation of the air upon a pendulum-watch in an exhausted receiver.
2. To try a body not spring made springy, whether it would lose any thing of its bulk, by weighing it before its springiness and after, in water.

Sir ROBERT MORAY produced a substance of a kind of salt petre made out of the earth of a common; and he mentioned, that there was a person, who would undertake to make as much salt-petre, as England should need, out of the commons and heathy grounds of England.

February 28. Sir PETER WYCHE, returned from Portugal, gave an account of what he had done concerning those instructions and inquiries recommended to him by the society at his going thither as envoy extraordinary from his Majesty to the King of Portugal; viz. that he had engaged for a correspondent in philosophical matters the professor of mathematics at Lisbon, father JOHN MARKES, an English jesuit; as also an ingenious merchant, Mr. HENRY JACOB; the former of whom had offered to make astronomical observations, if he might be furnished from England with a convenient quadrant; as also to endeavour to return an answer to the queries left with him, and to engage for the like correspondence a jesuit at Fernambuco.

nambuco. The other, Mr. JACOB, had also promised his concurrence in procuring the like account in answer to the memorial left with him.

It was ordered, that these correspondencies should be entertained by Mr. OLDENBURGO, and a quadrant provided, and sent to Lisbon, of the same kind with that of Dr. GODDARD.

Mr. OLDENBURGO mentioned, that Monsr. BULLIALDUS had by a note desired to know, whether in England the sea-compass was rendered more perfect than it was in other parts.

To which it was answered, that all the perfection of a sea-compass hitherto known in England consisted in touching the needle on a good magnet, in well librating it, and placing the variation truly.

Sir PAUL NEILE moved, that, as there was occasion, it might be observed from time to time, how the variation of the magnetic needle varies here; and that by correspondence in foreign parts the curious might be put in mind to observe such alterations there.

Mr. BOYLE moved likewise, that the inland variations remarked in OLEARIUS might be taken notice of.

The lord BRERETON affirmed, that a sea-compass being carried into an iron mine, the ore of which yielded 23 pounds in 120 pounds, had not been perceived to move there at all.

Mr. HOOKE produced a box with optic-glasses fitted in it, designed to contract the power of a long telescope into a short one^b.

It was ordered, that the eye-glass should be made to draw, and that the two steel glasses should be truly ground, well polished, and exactly placed.

Sir PAUL NEILE taking occasion to speak of what had been formerly communicated from Rome, viz. that EUSTATHIO DIVINI had made an optic-glass of rock-crystal, which had proved a very good one, though full of veins, intimated, that he thought, that they were not veins; and that whether they were or not, might be tried by grinding such glasses over again; which being done, if they were true veins, they would change their posture, but they would not do so, if they were not veins.

He moved likewise, that to find, whether the breadth of a glass, or the way of working it, cause an object-glass to bear a greater aperture, there might be ground two glasses for the same length, of different diameters, by the same man, upon the same tool.

^b This is described in his treatise of *Heliocopes*, printed in 1676.

The lamp brought in Feb. 6, was again produced with a small wax-light, to serve for a wick, and so contrived, as to be thrust up by the moving weight in the vessel. But this contrivance not succeeding, it was suggested, that there should be provided a rush with a small brass wire in it, and likewise a small waxed thread with a cotton whipt about it. This was ordered to be provided against the next meeting.

The circular pendulum designed for an equal motion with unequal weights being again spoken of, the president affirmed, that though the inventor Mr. Hooke had demonstrated, that the bullet of the circular pendulum, if it can be always kept rising or falling in a parabola, will keep its circular motion in the same time; yet he had not demonstrated, that the diameter of the parabola from the point of contact in the curve to the vertex of the diameter is equal to that portion of the curve from the said point of contact to the vertex of the same curve, *plus* half the *latus rectum* or *plus* double the focus of the parabola.

March 7. Mr. LAKE was admitted.

The lamp was again produced, having for a wick a small thread of lead thrust through the midst of cottons, which melted as the cotton burnt.

The new telescope produced at the last meeting was ordered to be perfected against the next meeting.

Mr. Hooke mentioned a metal, that might be ground with sand, and polished with putty; which was ordered to be put in execution.

Dr. WREN intimated, that an exact plan was best made by motions in a straight line.

Sir ROBERT MORAY mentioned, that Mr. REEVES would make a globe of 120 feet length, and give the use of it to the society, if they would mount it. Whereupon it was ordered, that Mr. REEVES should be made acquainted, that if he would make such a glass, they would take care to fit it for use with what they should judge convenient.

Commissioner PETT was desired to make such observations of tides, as were directed in print; and it was ordered, that one of the printed books should be delivered to him by Mr. OLDENBURG for that purpose.

There were read several lists of particulars formerly recommended to several members of the society; and it was ordered, that they should be copied out, and delivered to those, who were concerned; and that the rest of the like lists be produced and read at the next meeting; as also, that every quarter of a year there be made the like extracts of experiments and observations committed to the respective members.

It was ordered, that the experiments of raising a weight and bending a spring by the force of gunpowder be profecured; and that experiments be made with the loadstone sent by Dr. COTTON: as also, that the operator attend Dr. WREN about his lamp; and that Sir ROBERT MORAY speak to his Majesty about the globe of the moon for another to be made after that model.

Mr. HOOKE was ordered to bring in writing at the next meeting his demonstration of the motion of his new lamp; and likewise the demonstration of the curve line in his circular pendulum.

He was put in mind to perfect his instrument for taking up things from the bottom of the sea so as to make it serve for all depths.

Dr. CROUNE was desired to bring a draught and description of his chariot.

Dr. WREN gave in the description of his new level; which was ordered to be read at the next meeting.

March 14. At a meeting of the COUNCIL were present

The lord bishop of EXETER, vice-president	
The earl of NORTHAMPTON	Dr. CLARKE
Mr. H. HOWARD of Norfolk	Mr. HENSHAW
Mr. AERSKINE	Mr. COLWALL
Sir ROBERT MORAY	Dr. BALLE
Sir PAUL NEILE	Dr. CROUNE
Sir ANTHONY MORGAN	Mr. OLDENBURG.
Dr. MERRET	

Sir ANTHONY MORGAN, elected into the council in the room of Mr. PALMER deceased, and Mr. HENSHAW were sworn as members of the council.

Sir ANTHONY MORGAN gave the council an account, that Dr. WILKINSON had delivered up the charter of Chelsea-college into his hands, and referred all to the discretion of the society without insisting upon any capitulation.

The council hereupon desired Sir ANTHONY MORGAN to acquaint Dr. WILKINSON, how well they had taken this frankness of his; and how ready they were to shew him their respect and kindness, as occasion should serve.

Sir ANTHONY MORGAN was likewise desired to consider, whether it would be necessary, that Dr. WILKINSON should make a formal resignation and surrender of the said charter.

He, Mr. AERSKINE, and Sir ROBERT MORAY were desired to look into the title of Mr. COLE to Chelsea-college, and having found it clear, to see a conveyance

ance of it made to the society, and to conclude with him for one hundred pounds for it.

Sir ANDREW KING by a note under his hand desired to be left out of the list of the society.

Mr. HOWARD desired, that if any papers concerning his family should be met with in the library, of which he had made a donation to the society, they might be carefully preserved for him.

The council licensed N^o. 23 of the *Philosophical Transactions*.

At a meeting of the SOCIETY on the same day,

Dr. PEARSON was elected.

Mr. HOOKE brought in the description and demonstration of his new lamp ; which was ordered to be registered ¹, as follows :

“ Let the vessel be made of brass, tin, wood, or the like, of a semi-cylindrical, hemispherical, or any rounded figure, placing the axis of that figure exactly horizontal, and leaving the upper part open. Then fit into it another semi-cylinder, hemisphere or like fashioned body, to the containing vessel of brass, wood, or any other material, which will be capable of being made lighter by half, than so much of the oil, as is equal to it in bulk. Let the two ends of the axis of this semi-cylinder terminate in two several pivots, and let the containing vessel have likewise two small holes in the centers of each end, into which let the pivots be fitted, and so ordered, that it may freely pass and turn round within the hollow of the containing vessel. On some part of the side of this containing vessel make a small socket, so that the hole of it, where the flame is to be, may be a little above the plane, that passeth through the axis. Then pour your oil into the containing vessel, and the counterpoising semi-cylinder shall always keep the surface of the oil of equal height with the horizontal plane, that passeth through the axis of both semi-cylinders.

“ Suppose it first perfectly filled to the horizontal plane ; then it is evident, that the whole solid semi-cylinder being about the oil, the one half of it will counterpoise the other, and so neither can have any pressure upon the oil.

As in the first figure, let F D G represent the containing vessel, filled to the line F G with oil ; and A B C the solid semi-cylinder, equal in weight to half as much oil as is equal to it in bulk : then it is evident, that the quadrant A E B will counterpoise the quadrant B E C, and neither side press on the oil.

Next, suppose it only to contain oil enough to fill half the semi-cylinder ; and let A B C in the second figure represent the containing vessel, D E F the solid

¹ Register, vol. iii. p. 177.

counterpoise, and A N B the oil; it is evident the two solid quadrants D N D and E N F, being each of them half the weight of the oil, and in the same position, must counterpoise the quadrant of oil A N B.

Thirdly, supposing it to contain any other quantity, less than will suffice to fill the vessel to the horizontal plane, that passeth through the axis, the same will follow, as in the third figure; let A N F represent the wedge of oil, and D E F the solid semi-cylinder: I say, the semi-cylinder shall, in this posture also, counterpoise the oil in the vessel. Make C N E equal to D N C, then shall F N B and B N E be equal, and consequently counterpoise each other. Next, C N E being equal to D N C, and D N C to A N F, it follows, that the wedge of liquor A N F shall be counterpoised by two equal wedges, each of half the weights D N C and C N E. The like may be demonstrated of any other quantity of oil whatsoever, less than will fill the vessel to the horizontal plane, and more than will fill the space, necessary, to be left between the concave and solid cylinder.

Mr. Hooke produced likewise a contrivance to make a motion of a clock to go along with the shadow on a wall, for which he offered a demonstration; affirming withal, that the same instrument would be applicable to all planes to make all sorts of dials; and that upon the same principle he would make an instrument to solve the inequality of days both from the sun's excentricity and his right ascension upon the elliptical as well as circular hypothesis.

The operator was ordered to bespeak a quadrant like that of Dr. GODDARD, to be sent to Lisbon; as also one of the largest globes, that Mr. MOXON uses to make, for Dr. WREN's telecopical moon, to be directed by the said doctor.

Sir THEODORE DE VAUX produced a paper containing a description of the tallow-chandlers trade, and the ways of making candles with the pith of rushes, and of making candles in moulds, and cheap candles for poor men to burn; with several queries for the improvement of the trade. The paper was ordered to be filed up; and mention being made in it of a way of multiplying the light of a candle, it was recommended to Mr. Hooke to consider of other ways of doing the same.

Sir ROBERT MORAY informed the society, that Mr. MAY had left with him for the repository a dead Indian bird like a crane.

Dr. CROUNE presented some pictures of Turkish habits for the repository.

Mr. WILLIAMSON produced extracts of two letters, one written by Dr. COLLINS^a in Moscow, January 7, 1664, giving an account of an English mechanician there, who had extraordinary skill in gunnery, as of shooting melted lead without gunpowder, and of contriving methods of destroying rigging and fire-

^a SAMUEL COLLINS, M. D.

ships: the other written at Dantzick, February 19, 1667, mentioning, that the same mechanician had invented a mill, which would form bricks as fast as many hands could take away.

Mr. WILLIAMSON was desired to procure a more particular account of these matters, and the secretary to cause a copy to be taken of these letters.

Mr. OLDENBURG read a letter written by Mr. SAMUEL COLEPRESSE at Underwood near Plymouth, March 6, 1667¹, giving notice of a late irregular tide at Crimmel-passage, and of the exceeding height of the tide in the preceding February; as also of a kind of turf cut out of the moors and charked, serving to make very cheap and sweet fires, and such as are used with good advantage in the blowing of tin, the fusion of which he affirms to be facilitated by it, and that it makes it to yield the better.

Sir PAUL NEILE mentioned on this occasion, that he knew of a peat in Wales, which being charked would make as good and sweet a fire, as could be desired.

Mr. OLDENBURG took notice, that Mr. COLEPRESSE had likewise sent him a paper containing an answer to almost all the queries formerly drawn up by Mr. BOYLE concerning mines, and afterwards printed: which paper was ordered to be read at another meeting, and it was directed, that the writer of it should be desired to write word, whether he had observed, whence the wind blew at the time of the extraordinary tide in January 14, 1667.

Dr. WREN's description of a new level for taking the horizon every way in a circle was read, and ordered to be registered²; as follows:

"If a concave-glass be placed to turn upon a foot with a ball and socket horizontally, and a drop of quicksilver be laid upon it, when the quicksilver lies upon the center of the section, the edges of the glass will be situated in a true horizontal plane, and consequently a dioptra laid upon it will give an exact level in any azimuth, without motion of the instrument: and this sort of level will prove as true, as from a pendulum of a length equal to the radius of the section."

Sir ROBERT MORAY mentioned, that he had given the printed inquiries about tides to commissioner PETT, to whom that matter had been recommended.

The new telescope contracting the power of a long one into a short, was referred to the next meeting.

Dr. CROUNE promised to bring in the description of his chariot at the next meeting.

¹ Supplement to the Letter-Books, vol. ii. p. 236.

² Register, vol. iii. p. 184. It is described by

Mr. HOOKE in his Animadversions on HEVELIUS's *machina cœlestis*, p. 65.

Mr. Hooke was ordered

1. To prosecute the experiments of raising a weight, and bending a spring, by the force of gunpowder.
2. To make experiments with Dr. COTTON's load-stone.
3. To perfect the instrument for taking up things from the bottom of the sea.
4. To bring in the demonstration of the curve line, that shall so regulate the motion of the circular pendulum, as to make it go equally with unequal weights.

The operator was ordered to attend Dr. WREN about his lamp.

March 21. Sir CLIFFORD CLIFTON, KNT. was proposed candidate by Sir GEORGE ENT.

Mr. Hooke produced again his new kind of contracted telescope of two foot long, performing the part of a six foot glass by the means of two reflexions. He was ordered to bring in the description of it, and to try it upon nocturnal objects; as also to have ready for the next meeting a six foot glass to compare it with, and to change the object glasses.

The operator was directed to acquaint Mr. REEVES, that the society accepted of his offer of making a hundred and twenty foot glass upon the condition that they should fit it for use.

Sir PAUL NEILE acquainted the society, that one Mr. SMETHWICK had shewn a glass, which he affirmed to be of a conic section, of about an inch and a half diameter; and that they tried it for an eye-glass in a twelve foot telescope, which had an ordinary object glass, fitted for a tube of that length, wherewith they saw a tree very well on Shooters-hill without any considerable colours; and that they used it also for an object-glass in a microscope, leaving it all open, and found it to take in a great deal of light, and to magnify up to the very edges with very little flaming.

Sir PAUL NEILE was desired to encourage the inventor, and he intimated, that he had advised him to apply himself to Mr. Hooke for assistance.

Mr. Hooke brought in the description of a very easy and simple but universal instrument to describe all kinds of plane dials, together with a demonstration of the principles and reason of it: Which was ordered to be registered, as follows:

"Unto the end of a very strait and stiff steel wire, as AB, fasten at one end an index at right angles with it, as qr, and at the other make a pair of forked arms, as CD, having two small center-holes, at each end one, as at E

* Register, vol. iii. p. 180.

"and

" and F, between which, if a right line be drawn, (as EF) it shall pass both
 " through the axis of the wire A B, and likewise be at right angles with it. This
 " done, make another wire of the same material, and in all other particulars ex-
 " actly the same with the former; then make a cross of steel EFGHI, sharpen-
 " ing all the four corners EIFH into very sharp and small pointed pivots, and
 " make all the arms of the cross exactly at right angles with one another; and
 " the length of each arm from the point of intersection exactly half the distance
 " between E and F. This done, join the two steel-wires (formerly described) to-
 " gether, by the cross, by putting two of the opposite pivots into the center-
 " holes of the arm of the one wire: the two other opposite pivots into the pivot-
 " holes of the arms of the other wire, which may be easily done, if those arms are
 " made a little springing: then, by any convenient contrivance (of which there
 " may be multitudes, as by a frame, or staples upon a movable screw, &c.) fo-
 " order these wires, that one of them may lie in, or parallel to, or at least in the
 " same plane with the plane of the stile; and with the same inclination to, or
 " angle with the plane of the dial, with the inclination or angle of the axis and
 " plane of the dial. And that the other arm may lie at right angles with, or
 " perpendicular to the plane of the dial, then shall the moving of the index of
 " the wire in the axis, equal spaces, cause the index of the perpendicular wire to
 " move unequal spaces, according to the proportions of the shadows. If there-
 " fore the wire of the axis be moved by an exact clock, once round in 24 hours,
 " or the space of time between the sun's leaving a meridian, and returning again
 " to the same, the index of the other wire shall move on the plane of the dial, to
 " which it is adapted, in the same velocity with the shadow of the sun in that
 " plane. The reason of all which is most evident, for if a plane be supposed to
 " pass through the axis of the stile, and to be turned round upon that axis with
 " equal velocity once in 24 hours, it is evident, that if at the beginning of its
 " motion, that plane pass through the center of the sun, it shall also continue to
 " pass through the same center, for its whole revolution; and consequently, that
 " part of the plane, which lies on the other side of the axis, opposite to the sun,
 " shall always be in the shadow of the axis; and consequently, the lines of the
 " intersection, of this moved plane, with the plane of the dial, shall give the re-
 " spective lines of shadow appropriate to that plane. But 'tis evident, from the
 " contrivance of the newly described engine, that those branches of the cross
 " whose pivots are centered in the arms of the wire in the axis, do always move
 " round the axis in the same plane, and consequently move equal spaces in equal
 " times. And it is likewise evident, also, that the other branches of the cross,
 " do always move both in a plane at right angles with the former plane, and con-
 " sequently move also about the axis equal spaces in equal times; and also in the
 " plane of the dial; and consequently must always lie in the line of the inter-
 " section of the plane through the axis with the plane of the dial, and must there-
 " fore always move, in the shadow of the axis, according to the several velocities
 " of the shadow, unequal spaces in equal times.

" The application of which instrument to the use of describing all sorts of dials
 " is so very evident that I think I need not further explain it: For if the index
 " of the axis be moved, to the equal divisions in a ring about it of hours, quarters,
 " minutes,

"minutes, &c. the index on the wire perpendicular to the plane of the dial will point out the respective unequal divisions on that plane. The use of this mechanical principle for equation of time, resolving triangles, raising water, facilitating wheel-work, and several other mechanical uses, I may hereafter shew."

Mr. HOOKE affirming, that upon the same principle he could frame an instrument to indicate the inequalities of the days, was desired to cause such an instrument to be made.

Sir ROBERT MORAY presented the society with an amethyst sent him out of Scotland, where, he mentioned, there were whole rocks of the same; and another stone sent him out of Ireland, of a yellowish colour, esteemed to be a kind of transparent spar.

The lord bishop of EXETER produced a letter from Dr. COTTON of November 16, 1666, importing, that he thought, that he should be able to furnish the society with as many magnets to be found in Cornwall, as they would use.

Mr. HOOKE was put in mind of making experiments with the great load-stone formerly sent by Dr. COTTON.

Mr. OLDENBURG mentioned, that he had lately received a letter from Paris, signifying, that the astronomers there saw frequently the new star in *collo Ceti*; and the other in *Cingulo Andromedæ*.

Mr. HOOKE observed, that the air had been for a good while so thick about London, that he had not been able to see those stars.

Sir PAUL NEILE mentioned, that Dr. WREN had taken care of his telescopic moon, in order to have another of a larger size made by it.

He was desired to bring in at the next meeting his demonstration for the curve line, that should regulate the circular pendulum for an equal motion with unequal weights.

Mr. HAYES produced a letter containing some observations concerning the figure of snow fallen in Hampshire-marsh; and the figures were ordered to be drawn with ink.

Mr. THOMAS COXE produced a small bone, which he said had been voided by Sir WILLIAM THROCKMORTON out of his bladder, into which it was supposed to have been forced by a shot made through the thigh into the bladder, the wound whereof was possibly healed up again.

* This letter is dated at Bramhill house March 13, 1667, and is entered in the Letter-Book, vol. i. p. 402.

He affirmed, that he had made the experiment of transfusing blood upon a mangy dog and a sound dog, by opening a vein in each of them; and that he had found, that the sound dog was not infected thereby, and the mangy dog was cured.

Mr. OLDENBURG produced an account, which he had received from Paris, of the success, which the curious had met with there in the same experiments, viz. that they had so tried it, as that the same blood had been in three dogs within the space of six days; one of the animals having been a bitch big with puppies, which some time after the operation had cast one whelp dead, having not above three or four drops of blood in its whole body.

It was ordered, that at the next meeting this kind of experiments should be refused; and Dr. KING was desired to perform the operation by letting most of the blood of a dog run out before any other was infused; and that then he should be recruited by the blood of a sheep.

1667, March 28. At a meeting of the COUNCIL were present

The President

The earl of NORTHAMPTON

Sir PAUL NEILE

Sir ANTHONY MORGAN

Mr. HENSHAW

Mr. COLWALL

Dr. WILKINS

Dr. GODDARD

Dr. WREN

Dr. CROUNE

Dr. BALLE

Dr. POPE

Mr. OLDENBURG.

Sir ANTHONY MORGAN gave an account of Mr. COLE's title to the land belonging to Chelsea-college: Which not being found clear, it was ordered,

That Sir ANTHONY MORGAN should be desired to speak with Mr. COLE from the council to this effect;

That if he made a legal conveyance of his lease of the land to the council of the society, and procured a release from those, who pretended to it, or got any such pretender to join with him in the conveyance of his lease, they would then pay him an hundred pounds.

Sir ANTHONY MORGAN was desired to consider of a deed of gift of the library, which Mr. HOWARD had presented to the society.

Dr. WILKINS was desired to consider of the instances, that might be proper to be inserted in the *History of the Society*; and having done so, to present them to the council.

At the meeting of the SOCIETY on the same day,

Sir CLIFFORD CLIFTON was elected.

VOL. II.

Y

Monfr.

Monfr. ISMAEL BULLIALDUS and Monfr. SAMUEL PETIT were upon their desire in a letter propos'd candidates by Mr. OLDENBURG.

FRANCIS SMETHWICK, esq; was propos'd candidate by Dr. WILKINS.

Dr. WILKINS was desir'd to speak to Mr. SMETHWICK, that the society was desirous to see one of his newly invented optic glasses, affirm'd by him to be not spherical, and performing better than spherical ones.

An experiment was made, by Dr. KING's operation, of bleeding a sheep into a spaniel dog, so as fifteen ounces of the dog's blood being first let out, before any supply of other blood was given, there were afterwards transfused into him out of the sheep thirty-six ounces at least, which was computed by the time of bleeding, measured by a minute watch; by which it appear'd, that in the space of four minutes seventeen ounces of blood, at least, had been let run into the dog out of the sheep; since the sheep being afterwards suffer'd to bleed into a dish for the space of eight minutes, the blood let out in that time weigh'd about thirty-six ounces; during which time the blood must be suppos'd to have run slower than it did before, when it was suffer'd to run into the dog.

Dr. KING was desir'd to give in a full account of this experiment at the next meeting, in order to its being registered.

Mr. BOYLE mov'd, that some animals might be bled to death, to see what quantity of blood they contain'd. Upon which the operator was order'd to provide a dog for the next meeting, to let out all his blood.

Mr. THOMAS COXE brought in writing the relation, which he made at the last meeting, of the experiment of transfusing the blood of an old mangy dog into a sound dog, whereby the former was cur'd, and the latter not infected. It was order'd to be registered¹.

Mr. HOOKE present'd some muscles grown in a stone at the bottom of the sea, for the repository.

Dr. WREN produc'd drawings of the figures of hail, which had fallen March 27, 1667, at four in the afternoon, the upper part of which was a perfect cone, the under part the frustum of a cone. Being turn'd up, it represent'd a marigold-flower. The angle, he said, was the angle of a pentagon; so that five of them join'd together made a circle. These drawings were order'd to be registered².

Dr. WILKINS present'd for the repository a kind of silken substance sent from Mr. WILLUGHBY, who affirm'd, that he had taken it himself out of a living shell-fish, call'd pinna marina.

¹ Register, vol. iii. p. 193. It is printed in May 1667.
the Philos. Transact. vol. ii. n^o 25. p. 451, for ² Register, vol. iii. p. 184.

Dr. CROUNE being called upon for a written account of his chariot, desired time till the next meeting; and the operator was, upon the doctor's desire, ordered to attend him for the making of such experiments with his chariot, as he should direct.

Mr. HOOKE's demonstration of the curve line in the circular pendulum was referred to the next meeting; as also Dr. WREN's lamp, and the quadrant, that was ordered to be made to be sent to Lisbon.

The operator was ordered to try the growth of lettuce-feed in open, exhausted, close, and compressed air, as it was suggested partly by Mr. BOYLE and partly by Dr. GODDARD; and likewise to try in an exhausted receiver, whether frog's spawn being inclosed there, the water, in which it is found, would come to any motion; this experiment being suggested by Mr. BOYLE.

Some of the members were of opinion, that by forcing out the air, the texture of the spawn would be extremely altered and spoilt.

Mr. HOOKE proposed an expeditious way of making bricks, the consideration of which was referred to the next meeting.

He promised to bring a six foot glass to compare with the reflecting box, to change the object glasses.

April 4. At the meeting of the COUNCIL were present

The President

Mr. AERSKINE
Sir ROBERT MORAY
Mr. HENSHAW
Mr. COLWALL

Dr. CROUNE
Dr. BALLE
Mr. OLDENBURG.

N^o 24 of the *Philosophical Transactions* was licensed; which being peculiarly designed for the instruction of seamen in making observations in their voyages, one hundred copies extraordinary were ordered to be printed off at the expence of the society, and lodged with the master of Trinity-house, to be by him disposed of to fit seamen.

It was also discoursed of, that the operator would consider, what would be the charge of a whole set of the instruments described in this number of the *Transactions*.

It being likewise mentioned, that Mr. SPRAT desired to know, what he should do in the matter of inserting the statutes into the *History of the Society*, it was thought proper, that Dr. WILKINS should be desired to peruse the said statutes, and so to abridge them, as that the most material and least alterable particulars thereof might be inserted in the history.

At the meeting of the SOCIETY on the same day,

Monfr. BULLIALDUS, Monfr. PETIT, and FRANCIS SMETHWICK, esq; were elected.

Mr. OLDENBURG read a Latin letter dated January 1, 1667, addressed to him from a Venetian philosopher, FRANCESCO TRAVAIGNO^a, making mention of a system of a new practical philosophy established by himself, and of a printed Synopsis concerning the same. It was ordered, that Mr. OLDENBURG should return him a letter of thanks^b, and desire him to send over that *Elencbus* of experiments mentioned by him in his other letter to Sir KENELM DIGBY.

Dr. KINO brought in an account in writing of two experiments made at his own house by himself, assisted by some friends of his; one of which was the bleeding of a calf by a vein into the vein of a sheep; the other of injecting sugared milk into the vein of a dog, after the emission of eighteen ounces of his blood: Which experiments were ordered to be registered^c.

The operator gave an account of the lettuce-seed put 30 March, 1667, into the rarified, close, and open air; that that in the close air had sprouted, (which the members also saw) that in the open air had not then sprouted; and that in the exhausted receiver had miscarried.

It was ordered, that the experiment of that in the exhausted receiver should be made again.

Mr. HOWARD produced a nosegay of dictamnus of two years old.

Dr. CROUNE produced a letter of Mr. TOWNLEY to him, dated 25 March, 1667, taking notice of Monfr. AUZOUT's pretended invention of dividing a foot into 30,000 parts, and taking thereby angles to a very great exactness; and shewing, that Mr. GASCOYNE had before the late civil wars both invented and used such an instrument, which Mr. TOWNLEY had by him, and of which he would send a more perfect description, if desired. Dr. CROUNE was requested to desire that description, and the observations made with the instrument; and Mr. TOWNLEY's letter was ordered to be entered into the Letter-Book^d.

Dr. WREN produced his new lamp, wherein the oil would not come faster than it is consumed. He having mentioned, that he had a still better way, was desired to communicate it at the next meeting.

It was ordered, that Mr. HOOKE produce his method of making bricks with less charge and more speed than hath been hitherto used; as also, that he bring in

^a Letter-Book, vol. i. p. 187.

^b Mr. OLDENBURG's letter in Latin was dated at London 15 May, 1667, Letter-Book, p. 318.

^c Register-Book, vol. iii. p. 185. This ac-

count is printed in the *Philos. Transact.* n° 25, p. 449, for May 1667.

^d It is not entered there, but it is printed in the *Philos. Transact.* vol. ii. n° 25, p. 457.

his demonstration of the curve line regulating the circular pendulum, so as to make it move equally with unequal weights.

It was likewise ordered, that at the next meeting an experiment be made of letting out the blood of a dog, both by a vein and artery, at one and the same time, out of vessels equally distant from the heart, as out of the jugular vein and a jugular artery; and that the operator provide a dog for that purpose:

That another such experiment be made, as Dr. KING had given at this meeting an account of; and that the recipient sheep be turned to graze again: And

That Mr. THOMAS COXE bring in at the next meeting his paper about the bone voided out of the bladder of Sir WILLIAM THROCKMORTON.

April 11. Sir CLIFFORD CLIFTON sent in his admission-money.

Dr. WREN's new lamp was produced and approved. He intimated, that the main point in it was to balance it well. He was desired to make a scheme thereof, with some discourse upon it in writing, which he promised to do.

He mentioned, that he had seen a digging engine contrived by one Mr. BAYLEY, which he said would perform twice as much as the same number of men in the usual way.

A paper of Dr. MERRET was read, containing a description of granaries, as they were built at London, together with the way of ordering the corn in them*. And not having met with any person in London, who could give him a good account of the granaries at Dantzick, in Poland, and at Amsterdam, he desired, that letters might be written to those places, soliciting an account of the structure of such buildings, as they were there.

Dr. WREN related, that some of the granaries of Dantzick were of eight or nine stories high, having funnels in their floors, to let the corn run from one into the other, the lowest floor serving for a warehouse.

He remarked likewise, that in Muscovy they preserved their corn under ground, digging a great hole of the figure of a sugar-loaf, broad at the bottom, and pointed towards the top, plaitering it within, and covering it with a stone; into which they put the corn, when first well dried.

Mr. BOYLE mentioned a way of freeing the air from its moistness, by exposing a quantity of salt of Tartar, which would imbibe it.

It was ordered, that in case the merchants of London could not give a good account of the granaries in the places abovementioned, the secretary should write thither, and desire one.

* Philof. Transact. vol. ii. n^o 25. p. 464.

The lord BRERETON affirmed upon his own experience, that corn well dried needed not to be malted for brewing; which he had tried more than once with oats.

Sir ROBERT MORAY mentioning, that lieutenant-colonel DRUMMOND had been long in Muscovy, and could doubtless give a good account of their granaries, as well as he had given him of their way of ordering bees, was desired to procure both those accounts from him; and to draw up some heads of inquiries concerning bees, to be recommended to a gentleman going to Muscovy.

Mr. OLDENBURG produced and read a letter written at Paris by Monfr. PECQUET to Monfr. CARCAVI*, containing an account of a new anatomical discovery made by the said Monfr. PECQUET and Monfr. GAVANT, of a communication between the *duëus thoracicus* and the emulgent vein: upon which it was desired, that the physicians of the society would, as they had an opportunity, see whether they could observe the like.

Sir GEORGE ENT moved, that some care might be taken to observe what passage there might be from the stomach to the kidneys, and that this should be tried chiefly upon fowls, which have more open passages.

It was thereupon ordered, that as many of the anatomical committee, as conveniently could, should be desired to meet on the Monday following about four of the clock in the afternoon at Sir GEORGE ENT's house, to consider of and set down a method for making such kind of experiments; which being done, a curator should then be particularly appointed to make them.

Dr. WILKINS renewed his former motion†, that the physicians of the society would employ their interest with those of their profession, who had staid in London, to obtain from them their observations of the late plague in 1665.

Sir GEORGE ENT, Sir THEODORE DE VAUX, and Dr. CHARLETON were desired accordingly to speak to Dr. GLISSON and the French pest-master about this particular.

Sir GEORGE ENT moved, that a dog might be bled almost to death, and then the blood of another dog transfused into him, to try to recover him.

The operator was ordered to have dogs ready at the next meeting for that purpose.

He was likewise ordered to be at Dr. KING's house on the Monday following at two in the afternoon, for repeating the experiment of bleeding a calf into a sheep by a vein; which being done, the sheep should be kept alive and turned to graze again:

* Printed in the Philos. Transact. vol. ii. n° 25, p. 461.

† On the 28th of March, 1666.

It was ordered, that Dr. KING be desired to give a farther account in writing of the experiment, which he had made in private of injecting eighteen ounces of milk and sugar into a dog, from which he had taken as many ounces of blood, whether the dog lived or not :

That Mr. THOMAS COXE be put in mind of giving in writing the account of Sir WILLIAM THROCKMORTON's voiding a little bone at his bladder : and

That a dog be bled both by a vein and artery at one and the same time ; and that the differences of the arterial and venal blood be more particularly considered than had been before done.

Mr. HOOKE was put in mind to bring in a model for his expeditious way of making bricks ; as also a six foot glass to compare with his reflecting-box by changing the object-glasses.

The operator was appointed to make the experiment with frogs spawn in an exhausted receiver.

April 18. Dr. KING brought in a written account of his concerning the second experiment made by himself in private upon a sheep and a calf, by transfusing the venal blood of the latter into the vein of the former, turning the sheep, after the operation, to graze again : and another written account of his containing some farther observations made by him upon a dog, into whose veins he had injected a quantity of sugar'd milk, after the letting out of him the like quantity of blood : both which accounts were ordered to be registered *.

Dr. KING having mentioned, that the dog, which had the sugar'd milk injected into his veins, had stunk before he died, Mr. BOYLE moved, that this experiment might be tried again, to see whether the like effect would follow.

Dr. CROUNE moved (what had formerly been suggested by Mr. BOYLE) that a purging medicine might be given to the emittent dog before the operation, to see, whether the recipient dog would be thereby purged ; and how ?

The experiment of letting a dog bleed almost to death, and then transfusing into him the blood of another dog, was deferred till another meeting.

Sir ROBERT MORAY presented from Sir ROBERT HARLEY, for the society's repository, 1. A young tiger's skull. 2. Four Indian arrows of that kind, which is called poisonous. 3. Some strange American flies. 4. An ape's skull. 5. Two fish-scales, in part silver-coloured. 6. Two nuts, one of which, bared of its scale, had the likeness of an ape's face. 7. An excellent colour made of the American Rocou-tree, with a leaf of that tree.

* Register, vol. iii. p. 187, — 189, and 192. See Philof. Transact. n° 25. p. 451.

Sir ROBERT MORAY presented also from the lord CLENOLEU a pair of bellows, all of wood, without leather, used in Sweden for great works, giving a greater blast, and being cheaper than common bellows.

Sir GEORGE ENT was called upon to give the society an account of what had been done by the committee appointed at the last meeting to meet at his house to consider of experiments to be made for the finding out what passages there might be from the stomach to the kidneys. He said, that very few had met, and that little was done to that purpose.

It was thereupon desired, that the persons concerned would attend that meeting better; and the operator was ordered to carry some lobsters, flounders, or frogs thither; and Mr. HOOKE was desired to be there, to make sketches of what should be observed.

Mr. HOOKE produced his model for brick-making, and promised to produce another at the next meeting.

He was put in mind to bring in his demonstration for the curve-line to regulate the circular pendulum; as also to produce his method of making spherical-glasses bear great apertures without colours.

April 25. At the meeting of the COUNCIL were present

	The President	
Mr. AERSKINE	Dr. GODDARD	Mr. COLWALL
Sir ROBERT MORAY	Dr. MERRET	Dr. CROUNE
Sir PAUL NEILE	Dr. CLARKE	Dr. BALLE
Dr. WILKINS	Mr. HENSHAW	Mr. OLDENBURG.

It was resolved,

That in the petition to his Majesty about the enlargement of the society's charter, and the granting of Chelsea-college, the clause concerning a recorder for the society be omitted; and that there be inserted in this petition a power to be granted to the president alone to license such books as are published by any fellow of the society, and to employ other printers besides those of the society:

That the said petition be presented to the King by the president and such others of the council, as the president should take with him:

That the lord ARLINGTON, secretary of state, be desired to prepare and have ready a warrant concerning the particulars of the said petition for his Majesty's signing: and

That

That the committee for the additions to be made to the society's charter meet on the Monday following about six of the clock at the president's house, to consider of the statutes to be inserted in their *Histroy*.

N^o. 24 of the *Philosophical Transactions* was licensed.

At the meeting of the SOCIETY on the same day,

Dr. PEARSON was admitted a member of the society.

Mr. HOOKE produced a level, almost the same with that of the French, of which an account had been lately published in the *Journal des sçavans*. He was ordered to give a scheme and description of it in writing.

He proposed a way of measuring the circumference of the earth with a twelve foot glass and three stakes, to be practised in St. James's Park in a calm day. It was ordered to be put in execution as soon as might be.

Mr. THOMAS COXE's relation concerning a bone voided out of the bladder of Sir WILLIAM THROCKMORTON was read, and ordered to be registered*, as follows :

" Sir WILLIAM THROCKMORTON had from his youth upwards passed through the various accidents of a soldier's life ; and particularly, in his service for the King in the late civil wars, received many shots very dangerous ; which occasioned the taking out of several splinters and fragments of bones, at divers and considerable distances of time, since the receipt of those wounds. Some while after this (remaining still, as to all other respects, in a good condition of health) he complained of a difficulty and sharpness of urine, together with a dull pain and soreness about the bottom of his belly, which by intervals remitted, and again at times came more violently upon him, and so continued for many years together, to come and go by fits. But some months since, it grew more than usually troublesome to him, which causing a vehement suspicion of the stone, made those about him persuade him to be searched, which was done by an able lithotomist, who, upon both the ways of exploration, assured him, that he had a stone in his bladder, and that in the search he had toucht upon it with his catheter.

" After this, his pains pressed upon him every day more and more, till at last, with all the striving and torment imaginable, he voided that (with some noise and violence) into the urinal, which was taken for a stone, till the King (who was pleased to view it with more curiosity than others had done) observed it to be no other than the fragment of a real bone : which being, from that day forward, obvious to every man's eye, gave ground to conjecture, that it had been violently divided from the whole bone, by some shot he had received many

* Register, vol. iii. p. 190.

" years before the voiding of this, forced by some secret violence of the bullet through the substance of the bladder, and lodged in or about the neck of it, which it had for so long a time vellicated and obstructed, till it was discharged through the urethra by this extraordinary conatus of nature. The greatest objection to this probable conjecture may be the old tradition of the great difficulty of healing the wound of the bladder, that the bone must be supposed to have made in its penetration; which though HIPPOCRATES affirms to be incurable, later authors assure us upon their repeated experience to have been healed and cicatrised.

" A parallel case to this may be read in TULPIUS's observations, Lib. 4. cap. 29. pag. 340. of the Amsterdam edition.

" Some days ago this gentleman died of diseases altogether different from what has been here spoken of. His body scented so very strong presently after his death, that it was impossible to make those discoveries by dissection, which otherwise upon the account of this, and other inquiries, might have proved very satisfactory to the spectators."

Sir THEODORE DE VAUX's history of making wax-candles was read, and ordered to be filed up.

Mr. HOOKE produced a letter to him from Mr. JOHN SELLERS dated at Wapping, April 12, 1667, and containing an answer to two magnetical queries printed in the *Philosophical Transactions*, N°. 23. p. 423, 424. Which letter was ordered to be entered into the letter book^b.

Mr. HOOKE was desired to enquire of Mr. SELLERS, what method he used to make a needle turn north and south without touching it with a loadstone.

He remarked, that a drill, by making a hole with it in a piece of steel in a perpendicular position, would contract the verticity of north and south.

Mr. BOYLE moved, that the following magnetical observations might be made, 1. Whether the dipping-needle does not in time vary in the same place. 2. Whether or no, when the dipping-needle is in that position, in which the inclination is found to be greatest, and in which the circle is supposed to shew the magnetical meridian of the place, the distance of that circle in degrees and minutes &c. from the true meridian of that place, be the same with the declination of a magnetic needle horizontally poised, from the true points of north and south.

Mr. HOOKE was desired to cause to be made both horizontal and inclinatory magnetic needles, as exact as might be, and to have an inclinatory one hung up constantly.

^b Vol. ii. p. 13. It is printed in the *Philos. Transact.* vol. ii. n° 26. p. 478. for June 1667.

Mr. OLDENBURG produced several letters and papers come to his hands from abroad. One from the earl of SANDWICH to the president dated March $\frac{1}{2}$, 1667, at Madrid¹, accompanying some celestial observations. Another from Mr. DESCALET at Surat, dated Sept. 6, 1666, giving some account of the temperature of the air of that place, of the overflowing of the great rivers in those parts, &c. with some observations made by him of the comet in 1664; which were ordered to be extracted from the letter. A third was a paper of Monfr. BULLIARDUS, containing some observations made by himself about the *Nebula in cingulo Andromedæ*, and the star in *collo cygni*⁴. A fourth a paper sent by Mr. WILLIAMSON, dated at Crangen, March $\frac{1}{2}$, 1667, concerning some *parbelia* and odd inverted rainbows, lately seen in those parts: which was ordered to be filed up. A fifth a paper sent by Mr. OUDART, dated April 17, 1667, concerning the usefulness of snakes in catching rats and mice at Tangier; which was likewise ordered to be filed up.

Dr. MERRET gave the society an account of some observations made by him upon the stone called *oculus mundi*, which made him doubt, whether it be not an artificial stone made of cat's eyes. He was desired to give in these observations in writing.

The experiments appointed for the next meeting were

1. Another method of Mr. HOOKE for making bricks:
2. The comparing of a six foot glass with his reflecting-box.

April 29. At a meeting of the COUNCIL were present

The President

Mr. H. HOWARD of Norfolk.
Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Dr. WILKINS

Mr. HOSKYNs
Mr. COLWALL
Dr. BALLE
Mr. OLDENBURG.

Dr. WILKINS was desired to be mindful of selecting upon every head of the matters hitherto done by the society one or two instances to be offered to the council for their approbation, and then to be inserted in the *Histery*.

It was ordered, that Mr. HOOKE bring to Dr. WILKINS the several heads, which he had drawn up for that purpose: and

That the treasurer do not call upon Mr. SMETHWICK for any admission-money, nor the weekly payments.

¹ Letter-Book, vol. i. p. 406.

⁴ Printed in the *Philos. Transact.* n° 23. p. 359.

May 2. At a meeting of the SOCIETY,

Dr. KING's paper giving an account of an experiment made by him upon a mangy dog was read, and ordered to be registered*.

He was desired to try the transfusion of the blood of a dog or fox into a sheep or lamb.

Dr. LOWER being introduced by Mr. BOYLE gave the society an account of an experiment made by him at Oxford of breaking the *ductus thoracicus* in a dog under the subclavial veins; upon which the animal died the fourth day after. He promised to give the particulars in writing.

He remarked, that the channel lately found by Monfr. PÉCQUET at Paris was nothing but a lymphaduct from the kidneys to the receptacle of the chyle, not, as Monfr. PÉCQUET would have it, from the receptacle to the emulgent.

It was ordered, that Dr. LOWER's experiment should be made by tying up the *ductus thoracicus*, to see what might be discovered by the regurgitation of the chylous matter; whether any new vessels?

Mr. HOOKE having proposed the experiment of measuring the circumference of the earth for the Monday morning following in St. James's Park at the canal; it was ordered, that the apparatus for it, viz. a telescope of 12 or 15 feet and some stakes, should be made ready against that time.

May 9. PHILIP SKIPPON, esq; was proposed candidate by Dr. WILKINS.

HENRY and THOMAS HOWARDS, esqs; the eldest and youngest sons of Mr. HENRY HOWARD of Norfolk, were proposed candidates by Sir ROBERT MORAY.

The brick-engine was produced again, and tried with some clay; but that being too stiff, the trial succeeded not.

The members discoursing afterwards upon the whole, and considering, that this way would require vast spaces of ground to lay the bricks upon thus made, thought best to lay it aside.

Dr. KING gave an account of an experiment made by him of quite cutting off a piece of a dog's skin, and of sticking it on again; and that he found it would not do, but that the skin mortified and was cast off. He was desired to cut off another piece of skin with the flesh on, and presently fasten it on again; which he promised to do.

* This paper does not appear in the register.

He undertook also to make the experiments of cutting out a dog's spleen without tying up the vessels; as also that of Dr. LOWER of breaking the *ductus thoracicus* in a dog.

Dr. CLARKE related, that he had cut out the spleen of a very lean dog, partly cutting, partly tearing the vessels, and not tying them up again; and that the dog lived and did very well upon it, and was always very chearful and amorous; and being afterwards opened, when knocked on the head, the vessels were grown fast to the neighbouring parts, and the mesentery covered with fat. He was desired to give all the particulars of it in writing, which he promised to do.

The operator was ordered to furnish the anatomical committee, which was to meet again at Sir GEORGE ENT's house on the Monday following, with the apparatus mentioned at the meeting of April 18, viz. some lobsters, flounders, &c.

Sir ROBERT MORAY presented the society with AMBROSE PARE's works.

Mr. HOOKE was ordered to send to Sir GEORGE ENT's house the medical book lately presented by Monsr. MENJOT, a Parisian physician, in order that Sir GEORGE might peruse it and give an account of its contents.

He was likewise ordered to procure some both dipping and horizontal needles as exact as could be got; as also to make the apparatus ready for observing the variation of the needle.

The experiments appointed for the next day were

1. The comparing of the reflecting tube with an ordinary one of six foot, by using the same object and eye-glasses in both.
2. To open the thorax of a dog, and to keep him alive with blowing into his lungs with bellows.
3. To make trials with the great load-stone formerly mentioned by Dr. COTTON.
4. To try in St. James's park between that and the following meeting, if it might be, the experiment of measuring the earth, and to give an account of the success at the next meeting.

May 16. Mr. SMETHWICK was admitted.

Mr. SKIPPON was elected and admitted.

Monsr. BULLIALDUS's letter in Latin dated at Paris May 16, 1667, N. S. acknowledging the favour of being elected into the society, was read.

† Letter-Book, vol. ii. p. 25.

Mr. OLDENBURG produced an algebraic proposition sent from Paris for reducing a biquadratic equation into two quadratic ones, that it may be effected in plain geometry. It was remarked by Dr. CROUNE from Mr. JOHN COLLINS, that this proposition was already well explained in the High Dutch algebra of JOHN HENRY RHON, a scholar of Dr. PELL; which book was translated into English, and then in the press^s.

Mr. HOOKE produced the two glass tubes, a common one of six feet, and another of the new way by reflection. Being compared by exchanging the glasses, the members judged the common one to shew the object more clear than the other did, though both shewed it of near the same bigness.

Upon consideration it was found and declared by Mr. HOOKE, that the reflecting-box had several defects; 1. that the intermediate glass of it was too thick. 2. That the glasses were not ground smooth. 3. That one of the glasses was convex, the other concave. It was ordered, that these defects be remedied against the next meeting.

The great load-stone of sixty pounds weight was tried, both the pieces of it being tied together. It moved a needle at about seven feet and a half distance; the great piece at about seven feet distance; the little piece at near six feet.

It was ordered, that it should be tried again by Mr. HOOKE in private, and an account of what he had observed be brought in; as also that it should be tried how far a good magnet moves iron.

Mr. BOYLE moved, that it might be tried somewhere in the ruins of London, what was the declination of the needle after the fire; since it was affirmed by authors, that after the burning of Vesuvius, the declination was altered in those parts. It was ordered, that Mr. HOOKE should take care to have this done.

It being inquired how the quick-silver stood about and during the time of the fire, Mr. HOOKE affirmed, that he had found it very high. Mr. BOYLE had not found his tube so.

Mr. COLWALL promised, that he would bring in an account of the observations made by himself, of the several stations of the quicksilver for seven months together, and of its station at the time of the fire and after it.

It was again ordered, that the magnetic apparatus should be made ready to observe the variation of the needle at Whitehall.

Mr. HOOKE observed, that he had a way of handling the needle so, as that it should move without friction.

^s It was published at London 1668, in 4to, under the title of *An Introduction to Algebra*. It was translated out of High Dutch into English by

THOMAS BRANCKER, M. A. much altered and augmented by Dr. PELL.

Dr. KING gave an account of having cut out the spleen of the dog, into which the sheep's blood had been formerly transfused; and that he had done it without tying up the vessels. The operator was ordered to carry this dog to the president's house; and Dr. KING was desired to bring in an account of his experiment in writing.

The operator was ordered to have a dog ready against the next meeting for opening the thorax.

The other experiments for the next meeting were

1. The perfecting of the reflecting tube.
2. The magnetic needles.
3. The injection of wind into a dog, to see, what influence it hath upon respiration.
4. The experiment of Dr. LOWER of breaking the *ductus thoracicus*, delivered by him to Dr. CLARKE, to be called for and read.

Mr. BOYLE moved, that the experiment of injecting wind or air might be improved by injecting fumes.

May 23. At the meeting of the COUNCIL were present

The President

Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Mr. HENSHAW
Dr. WILKINS

Mr. COLWALL
Mr. HOSKYNs
Dr. BALLE
Mr. OLDENBURG.

It was resolved, that the duchess of Newcastle ^a, having intimated her desire to be present at one of the meetings of the society, be entertained with some experiments at the next meeting; and that the lord BERKELEY and Dr. CHABERTON be desired to give notice of it to her Grace, and to attend her to the meeting on the Thursday following.

It was ordered, that for the said entertainment there be made ready the experiments of colours formerly mentioned by Mr. BOYLE; the weighing of air in an exhausted receiver; the dissolving of flesh with a certain liquor of Mr. BOYLE's suggesting, &c.

^a MARGARET, daughter of THOMAS LUCAS JOHN lord LUCAS, well known for her writings of St. John's near Colchester, esq; and sister of upon various subjects.

It being moved again, that such instances, as are to be inserted in the History of the Society, might be resolved upon, it was ordered, that it should be left to the president and Dr. WILKINS to agree upon such, as they should think fit for that purpose.

N^o 25 of the *Philosophical Transactions* was licensed.

At the meeting of the SOCIETY on the same day,

THOMAS HARLEY, esq; was proposed candidate by the president.

The experiments appointed for this meeting were called for, but none of them being ready, order was given not to fail of having them ready against the next meeting.

The lord BERKELEY mentioned, that the duchess of Newcastle had expressed a great desire to come to the society, and to see some of their experiments; but that she desired to be invited. This was seconded by the earl of CARLISLE and Dr. CHARLTON, who pressing, that it might be put to the vote accordingly, whether the duchess of Newcastle should at her desire be invited to be present at the meeting on the Thursday following; it was carried in the affirmative.

The ceremonies and the subjects for her entertainment were referred to the council.

A paper of Dr. WILKINS, given him by Dr. KING, about the effects of corrosion upon a knife by cider, was read, and ordered to be filed up¹.

It was remarked by some members, that in Herefordshire, a cider country, there was no complaint of the stone.

Sir GEORGE ENT mentioned, that the anatomical committee had begun to make some experiments at his house upon lobsters and scates; and that when they had made farther progress therein, they would give an account of them.

Mr. HOOKE moved, that some experiments might be made, to find whether it be the supply of fresh air, or the motion of the lungs, that keeps animals alive; which he said might be done by cutting a hole in the thorax, and making an incision in the lungs, and blowing into them by the *aspera arteria*. It was ordered, that the experiment should be made as soon as it could conveniently be done.

He moved likewise, that the *intestinum testis* in some animal or other might be cut off; which he thought could be as easily done as the taking out of a spleen; Which experiment was also ordered to be made.

¹ PRIN, D. D.

The operator was strictly charged to provide dogs from time to time for the use of the society, and of those, who, at the desire of the society, had undertaken to make experiments of several kinds upon them.

The experiments appointed for the entertainment of the duchess of Newcastle were, 1. Those of colours. 2. The mixing of cold liquors, which upon their infusion grew hot. 3. The swimming of bodies in the midst of water. 4. The dissolving of meat in the oil of vitriol. 5. The weighing of air in a receiver, by means of the rarefying engine. 6. The marbles exactly flattened. 7. Some magnetical experiments, and in particular that of a terrella driving away the steel-dust at its poles. 8. A good microscope. These experiments Mr. BOYLE and Mr. HOOKE were desired to provide and take care of.

May 30. Mr. HARLEY was elected.

Monfr. PETIT's letter to the society, dated at Paris May 27, 1667, N.S.^a, containing his acknowledgements for the honour of being elected into their body, was read.

This letter was accompanied with a paper containing several magnetical experiments, as that of Dr. GILBERT's terrella, and some of the variation of the needle.

Mr. HOOKE was put in mind of making ready the magnetical apparatus for observing the present variation of the needle at Whitehall; as also to observe that variation in the midst of the ruins of London, according to the suggestion of Mr. BOYLE on the 16th of May.

A letter from Dr. POPE to Mr. HOOKE dated at Exeter May 25, 1667, was read, giving an account of worms in the stomachs of cormorants, which he supposed to be the cause of their voracity. It was ordered, that it be filed up¹, and that Dr. POPE be desired to inquire, whether those cormorants had worms in their stomachs at all seasons of the year.

Another letter of his about grout-ale was produced, but the reading of it deferred till the next meeting.

Dr. CLARKE produced a paper of Dr. TURBERVILL concerning a man, whose spleen was cut out, and yet he survived.

Dr. CLARKE was desired to procure from the relator an account of the time when this was done, that being omitted in the paper.

The duchess of Newcastle coming in, the experiments appointed for her entertainment were made:

¹ Letter-Book, vol. ii. p. 30.
VOL. II.

¹ It is entered in the Letter-Book, vol. ii. p. 29.
A a 1. That

First, that of weighing the air, which was done with a glass receiver of the capacity of nine gallons and three pints; which being exhausted, and put into a scale, and then opened, and the air let in, weighed thereupon one ounce and seventy-one carats more than it did when exhausted.

Mr. BOYLE suggested afterwards, that a gage might be employed to know how much air was left, which was ordered to be done.

Next were made several experiments of mixing colours.

Then two cold liquors by mixture made hot.

Then the experiment of making water bubble up in the rarefying engine, by drawing out the air; and that of making an empty bladder swell in the same engine.

Then the experiment of making a body swim in the middle of the water:

And that of two well-wrought marbles, which were not separated but by the weight of forty-seven pounds.

After the duchess was withdrawn, Mr. HOOKE was put in mind of the experiment of measuring the earth in St. James's park, to be tried there on the Monday morning following.

Mr. COLWALL presented his paper of thermometrical and baroscopical observations; which was ordered to be registered.

The anatomical experiments appointed at the preceding meeting were ordered to be made at the following one.

It was ordered likewise, that the reflecting box be presented at that meeting, after the defects observed in it at the meeting of May 23, were rectified.

June 3. At a meeting of the COUNCIL were present

The President

Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Dr. WILKINS

Mr. HOSKYNs
Dr. BALLE
Mr. OLDENBURG.

It was moved, that a fit person for another curator to the society might be thought upon; and the council was desired accordingly to take it into consideration.

— It does not appear in the Register.

Mention

Mention was made by some of Dr. WALTER NEEDHAM, by others of Dr. RICHARD LOWER. This matter was left to farther consideration.

N^o 26 of the *Philosophical Transactions* was licensed.

June 6. At a meeting of the SOCIETY,

Sir BERNARD GASCON was proposed candidate by Mr. HENRY HOWARD of Norfolk.

WALTER NEEDHAM, M. D. was proposed by Dr. WILKINS.

A letter of Dr. POPE to Mr. HOOKE concerning the way of making grout-ale was read, and ordered to be filed up.

The founes of this liquor gave occasion to speak of the causes of founes in general, and the ways of curing liquors of it. Some members mentioned, that vintners use to restore their wines beginning to grow sour by quick lime and other calcined substances, which by precipitating the founes restore such wines, though, when the wines are ropy, they are past recovery. Others remarked, that red lead put into vinegar would sweeten it.

It was ordered, that the experiment should be made at the next meeting of dulcifying vinegar with red lead, oculi cancrorum, oyster-shells, crab's claws, chalk, &c. And that Mr. HOOKE take care of this experiment.

Mr. HOSKYNs mentioned, that the husks of grapes were used to turn wine into vinegar; which he said was also taken notice of by GLAUBER.

He suggested, that it were desirable, that the secretary by his correspondence in the East-Indies would learn the way used there of extracting spirit out of rice; which Mr. OLDENBURG undertook to do.

Mr. BALLE presented his observations concerning the weather, but took the paper home with him in order to make a fair transcript of it.

Mr. HOOKE remarked, that six or seven hours before the beginning of the storm of wind on the day preceding, the quick-silver in the wheel barometer had fallen very considerably, almost a quarter of a circle. Mr. COLWALL confirmed this by the observations made by himself.

Dr. KINO gave an account of the experiment lately made by himself of transfusing the blood of a dog into a sheep; the sheep being very sick upon it, but somewhat relieved by taking away some of her blood; it being thought, that she had received too much blood from the dog. He was desired to give this account with all the circumstances in writing.

* Register, vol. lli. p. 194.

He related likewise, that the sheep, into which formerly the blood of a calf had been transfused, and which was, after the experiment, turned to grass, after three weeks time fell sick, pined away, and died.

He was desired to repeat this experiment at his conveniency, and to send the sheep, on which the experiments were made, to Kensington to Mr. HENSHAW's house, who was desired to permit them to graze in his ground; which he promised to do.

Mr. HOSKYNs mentioned, that there was one Mr. WRIGHT, who had a stone like a slate taken out of a rock, which being thrown into warm water, and then put under a bed of earth, would produce mushrooms upon it. He was desired to produce some of this stone, which he promised to do.

Sir BERNARD GASCON took notice, that he knew also a gentleman in London, who had a kind of spongy stone, which being boiled in water would produce mushrooms in it. He promised to procure some of these stones.

Dr. WHISTLER moved, that the experiment so much discoursed of might be made, of pulverizing mushrooms, and infusing them in water warmed, and of throwing such water upon a bed of earth, to see, whether it would produce such a quantity of mushrooms, as was affirmed.

Mr. HENSHAW and Mr. EVELYN were desired to try this experiment, which they promised to do.

Mr. HOSKYNs intimated; that the gentleman, who had the stone abovementioned, would not scruple to declare the place, where that rock was, that yielded it.

He desired, that the Hungar's beer brewed in Holland without boiling might be inquired after, and the way of brewing it procured; which Mr. OLDENBURG undertook to do.

Mr. HOOKE was ordered to prosecute the experiment of measuring the earth in St. James's park. He named the Monday following for it. Mr. NEILE was desired to speak to Sir PAUL NEILE in the name of the society, that he would obtain leave to make that experiment in the park.

Mr. HOOKE was put in mind to perfect his reflecting-box against the following meeting.

He intimated, that this sort of telescopes would serve for a very convenient helioscope, to look upon the sun at all times, when it shines, without offence to the eye.

Dr.

Dr. KING being called upon to give account of what had been done at the last meeting of the anatomical committee at Sir GEORGE ENT's house, referred to Sir GEORGE himself, who was absent.

JUNE 13. The society did not sit.

JUNE 20. Sir BERNARD GASCON was elected *nemine contradicente*, and presently admitted.

Dr. WALTER NEEDHAM was likewise elected.

Mr. BALLE was desired to make the magnetic experiment formerly discoursed of by Mr. HOOKE.

He acquainted the society, that Dr. COTTON had, according to his promise, sent to them a load-stone of about 160 pounds weight for a terrella, which he had chosen out of above twenty hundred weight of the same stone; and that it would move a needle at above six feet diameter.

Mention being made of the mines where load-stones are found, Mr. BALLE related, that the mine, whence these came, is in a little round hill in Cornwall, where is also an iron mine: That the water, that is in the mine, is of a reddish colour: That there is a mixture of greenish stones up and down in the mine; and that there is likewise found a shining stone of a kind of murrey colour, something like an amethyst.

Mr. HENSHAW related, that in Italy there was a magnet, whose sphere of attraction reached above a foot, so as to hang one small key by the contiguity of another.

The method of making the experiment of opening the thorax of a dog, and preserving his life for some time by blowing into his lungs with a pair of bellows, being discoursed of, Mr. HOOKE reported a former experiment of his, that he had taken away all the ribs and the diaphragm, and left only the spine and great vessels; and that the experiment had succeeded, so as the dog lived some hours by blowing into his lungs with bellows; but as he ceased to move the lungs, the dog presently fainted, but revived upon a fresh agitation of the lungs. It was ordered, that Dr. KING be desired to join with Mr. HOOKE to make this experiment before the society at the following meeting.

Dr. KING related, that he had formerly taken out the heart, and cut off the head of a cat; and yet a good while after upon pinching the tail of the cat, she would stir her body, and kick pretty strongly with her hind legs.

Mr. HOOKE acquainted the society, that a friend of his had made many experiments of respiration, which he was desired to give them an account of at their next meeting.

2

Mr.

Mr. HOOKE tried the experiment, with which he had been charged at the meeting of June 6, of taking away the sharpness of vinegar, and reducing it to a real sweetness, by putting into a little quantity of vinegar some red lead in powder. The event was, that the sharpness of the vinegar was much abated, but not wholly discharged.

While this experiment was making, Mr. HENSHAW desired, that since vinegar was supposed to be wine deprived of its spirits, the vial might be close stopp'd, to discover, whether the acrimonious parts precipitated or evaporated, upon putting in the red lead.

Dr. GODDARD observed, that a mixture of vinegar and red lead gently distilled would yield an insipid liquor; but that if the fire be increased to a good height, there would come last of all a very acid spirit. He also observed, that there was a kind of sulphur in vinegar itself; and that saccharum Saturni dissolved in rose-water, while one's hand or a cloth is wet with it, will smell very sweet of the roses; but after it is dry, will smell like strong vinegar.

Dr. MERRET related, that he had long before given his son (then at St. Paul's school) to drink a bottle of Rhenish wine, wherein he had put some filings of steel; and that the youth forgetting to set it in a cellar, had put it on the tester of his bed; and after standing there about a month, it was as sharp as very good vinegar; but being suffered to stand longer, to observe what other changes it might have, in about two years after he tasting it found, that it had recovered its former goodness in all things; only it was of the colour of claret-wine.

The experiments appointed for the next meeting were,

1. That of opening the thorax of a dog:

2. More experiments of infusing steel and other metals in sharp menstrua; as also crustaceous things, such as egg shells, oyster-shells, crabs-eyes, coral, &c.

June 27. The experiment of opening the thorax of a dog, ordered at the preceding meeting, was deferred till the succeeding one, because Dr. King, who was to assist in making the experiment, could not be present at this meeting.

Mr. HOOKE made some experiments to dulcify vinegar, by infusing the filings of lead, egg-shells, brass, steel-dust, and oyster-shells, in several vials with vinegar; all which greatly deprived the vinegar of its acidity, and reduced it to some kind of vinosity. It was ordered, that these experiments be farther prosecuted against the next meeting.

Mr. BALLE was desired to send the load-stone, lately presented by Dr. COTTON, to Mr. HOOKE, who was to take care to have it well wrought into a terrella.

The bishop of EXETER related, that the miners in Devonshire and Cornwall, upon their first discovery of the tin-ore, guess at the quantity to be had, and always observe, that those mines run east and west. This was confirmed by Mr. WILLUGHBY, who remarked, that coals and other minerals, as well as tin, lie in that position.

Dr. MERRET mentioned, that a correspondent of his in those countries had always observed the position of mines to be generally east and west, except lead-ore; which hath not been observed to have any current or declivity of the vein, but is most commonly found north and south by the miners.

Mr. WILLUGHBY observed, that most mines lie high in the west, and so deepen more and more the farther east they run.

Mr. HOOKE reported, that he had observed cliffs of stone for near four miles together; that the natural position was horizontal, though in some places he had found them to lie much sloping, and in others perpendicular; which, he thought, might fall into those odd positions by some great earthquakes; and he was of opinion, that the great hills and mountains have been raised by earthquakes.

He mentioned a cliff in the Isle of Wight, the bottom of which was washed by the sea, wherein at a pretty depth below the top, and at many fathoms above the surface of the sea, he had found shells of several sorts; which he thought might possibly have been placed there by earthquakes removing the superficial parts of the earth raising the bottom of the sea, and sinking the surface of the land.

The bishop of EXETER suggested, that those shells might be carried in by subterraneous canals.

Upon this discourse of earthquakes some of the members were of opinion, that the great lakes might also be made thereby.

Mr. HOOKE related out of VARENIUS's geography, that in China, a lake of thirty leagues over was made by an earthquake, the earth then sinking; and in another place, for the space of forty leagues, the earth shook all at the same time.

Sir THEODORE DE VAUX mentioned, that a hill in Switzerland had been removed by an earthquake, with the vines and some trees still growing upon it.

Dr. WREN mention'd, that in Italy there was a lake of salt water of near an hundred and fifty fathoms deep; and that being deep, the water might be salt from what is dissolved of the earth. The bishop of EXETER was of the like opinion with respect to the saltness of the sea.

Mention being made of what Dr. KINO had related at the preceding meeting, that he had taken out the heart and cut off the head of a cat, and yet some time after, upon

upon pinching her tail, the body and legs would stir pretty strongly, it was thought, that this motion was only convulsive, and not out of any fenie.

Some of the members had observed, that when the heart hath been taken out of eels and other fishes, they have moved for two hours after.

Mr. Hooke reported, that he had taken a whelp out of the uterus, and dissected it in the evening, and that the heart beat the next morning, when he came to look on it again.

Dr. Wren had observed in flies, that if the head be cut off, the body will run away, and live a good while; and if the tail only be cut off, they will live a day; but if they are stabbed in the body, they will quickly die, all the muscles lying so about the breast, as they do likewise in crabs and other crustaceous fishes.

He mentioned likewise, that the blood of flies and insects was white; and that, though upon killing them, a red matter was seen, it was only excrement; and that he had observed, that one sort of beetles die by a worm, that eats them continually. He had farther observed, that all insects breed mites, when they are dead.

Mr. Boyle related, that he knew a man, who by a way used by him would undertake to be three hours at a time under water without any prejudice.

This gave occasion to discourse, what quality it was, that made the air fit for respiration. Some thought it became unfit by being clogged and entangled with grass vapours. Mr. Hooke was of opinion, that there is a kind of nitrous quality in the air, which makes the refreshment necessary to life, which being spent or intangled, the air becomes unfit.

He related an experiment long since made before the society with a chafing-dish of coals set in a close box, wherein was a pair of bellows so contrived, as to blow the coals with that air only, that was included in the box: the air so kept had this quality, that after one whole day's time fresh fire would not burn in it, till the grosser parts thereof were precipitated.

Mr. Henshaw related, that he had heard, that those, who went to the top of mount Olympus and other hills, used to breath through a sponge dipt in oil.

It was proposed by Mr. Hooke to have a rarefying engine made of wood big enough for a man to sit in. This was approved of by Mr. Boyle. Mr. Hooke thought, that such an engine might be made for five pounds; and was ordered to have one made as soon as possible.

He proposed a contrivance, which he had, to make a vessel to swim in under water, of any dimension, wherein he might pass as fast as in a wherry upon the Thames,

Thames, and at any depth he pleased with safety. He was ordered to compute the charge of such an engine, and report it to the society at the next meeting.

Mr. BALLE produced some spars and diamonds of several kinds, asbestus, and some other stones of a murrey colour, taken out of the loadstone mines; which were delivered to Mr. Hooke for the repository.

The experiments appointed for the next meeting were,

Mr. BALLE's of the loadstone; the opening the thorax of a dog; and a farther account of the infusions in vinegar.

July 4. The experiment of opening the thorax of a dog, ordered at the preceding meeting, being again called for, was deferred till the following one on account of the absence of Dr. KING. Mr. Hooke was desired to join with any physicians of the society, and to take care, that the experiment be then made without fail.

Some other experiments about dulcifying vinegar by dissolving therein crustaceous substances and metals, ordered also at the preceding meeting, were not made at this.

Mention being again made of the position of mines, that they generally lie east and west, the lord BRERETON related, that, according to his observations, minerals have not any particular tendency that way, but spread themselves all manner of ways; and that in a mine, which he had lately opened in Cheshire, there were twenty five veins, which ran so many several ways.

His lordship likewise related out of MERIAN's book concerning the Alpes, written in High Dutch, that in *Glossa Bletchia*, one of the hills there, is a river, wherein is a matter like ice, which continually congeals into crystal. The author treating also of the growth of that hill and many other subjects worth notice, Mr. HAAK was desired to translate this book of MERIAN into English for the use of the society, which he promised to do.

The lord BRERETON related also, that the river Weaver running from Nantwich to Northwich for about twenty miles had manifestly increased of late, and exceeded its banks, that did not use to be full: that upon digging a salt-pit thereabouts about two yards deep he found a pavement and Roman coins, and at a greater depth: that two miles off from that place upon digging was found at the depth of 21 feet (which was three yards and a half below the level of the river) the skeleton of a stag, which his lordship had then in his keeping.

Mr. HENSHAW remarked, that he had been told by Mr. JONAS MOORE, that in the great level of the fens, digging thirty-four feet deep, he had found a Roman cauley.

Mr. COLWALL observed, that in that part of Lincolnshire called Holland, the sea had left the shore for a great distance.

Mr. BALLE remarked likewise, that by the river Ex coming to Exeter, the water was gone off some acres.

Dr. WILKINS produced an account printed at Paris of two experiments made by the Royal Academy of Sciences there of the transfusing of blood*. The first was on a youth of fifteen or sixteen years of age, who had a violent fever and a lethargy upon him, his memory being lost, and little hopes of life. After he had been bled at a vein considerably, he had the arterial blood of a lamb transfused into him: and though before that he would be so sleepy, as scarce to be able to take sustenance, yet the next morning after this operation, he got up, and went about his business before five of the clock, and continued lively and well. The other experiment was on a labouring man, from whom ten ounces of blood having been taken, twice as much from the crural artery of a lamb had been put into him. The event was, that though after the experiment the man did not repose himself, as he had been desired, yet he was very well, and said, that he found himself more light and lively than he had ever done in his life before; and offered, that they should make that experiment upon him as often as they would.

Mr. HOOKE excused the want of experiments at this meeting, in regard he had spent great part of his time in examining an instrument, whereby to produce air out of water, which did not succeed; on which account he was of opinion, that little air is made out of water, but what may rush into the pipes together with it, as in the bellows at Fiale. Mr. HOOKE was ordered to bring in a description of this instrument, and an account of the experiments in writing, at the next meeting.

SIR WILLIAM CURTIUS, knt. and bart. then in Germany, was proposed candidate by the lord BRERETON, according to his desire in a letter, in which he promised to serve the society in any thing within his power in Germany, during his stay there.

Mr. HOOKE and Mr. BALLE were desired to observe the convexity of the canal in St. James's Park, and to give an account of it to the society at their next meeting.

The experiments appointed for the next meeting were,

1. That of opening the thorax of a dog:
2. More experiments for dulcifying vinegar and other sharp liquors:
3. Mr. BALLE's experiment with the loadstone.

* This account is probably that published at Paris in 4^{to} in 1667, under the title of *Lettre de M. DEHIS, professeur de philosophie et de mathema-*

tique à M. de MONTMOR, premier maître des requêtes, touchant deux expériences de la transfusion faites sur des hommes.

July 11. Mr. HOOKE desiring to be excused from making the experiment of opening the thorax of a dog, Dr. BALLE and Dr. KING were requested to take care of it at the next meeting.

Mr. HOOKE having made this experiment formerly was desir'd to give some account of it; who related, that he had cut away all the ribs of the dog, taking out the diaphragm, and left only the spine and the great vessels; and that blowing with a pair of bellows and a pipe thrust into the windpipe of the dog, the heart continued beating, and the eyes very lively for the space of two hours, which might have lasted much longer; but upon ceasing to use the bellows, the heart grew convulsive and dying, which likewise would recover again as soon as the motion was renewed. He remarked, that he designed this experiment to understand the nature of respiration.

Sir PAUL NEILE related, that one day hunting in the bishop of WINCHESTER's park at Egham he shot a deer with a broad-headed arrow out of a steel-bow, which made a wound from the diaphragm to the haunch, clear open. He seeing the wound so great, set only an old dog to hunt the deer down, which pursued the deer so long through the bushes in the park, till the dog was tired, and all over of a white foam with sweating. When the deer fell, it was found to have lost all its guts by running among the bushes a very considerable space of ground after it had received the wound.

Mr. HAAK being put in mind of his late undertaking to translate Mr. MERIAN's book on the Alpes out of the High Dutch into English, reported, that he had a son-in-law now dwelling in that country, from whom he could procure a more exact description of Glösa Bletchia, and other remarkable things there, than he thought that book might afford; and he promised to write for an account as soon as he could.

Mr. MERCATOR's observations of the barometer from the 6th of December to the 7th of July were brought in by Mr. HOOKE, and ordered to be entered.

The bishop of EXETER remarked, that Mr. MERCATOR had acquainted him with his theory of longitudes, which consisted of three particulars, equation of time, libration of instruments, so that no motion might discompose them, and a defence from the air; and that it was to be performed with a pendulum-clock.

Mr. HOOKE reported, that Dr. CROUNE had received from RICHARD TOWNLEY, esq; Mr. GASCOYNE's instrument for measuring the diameter of the stars with great exactness; which instrument was afterwards shew'd to the society, with the models of some others; and the improvement of the first invention.

^p Sir PAUL's father, Dr. RICHARD NEILE, was bishop of Winchester, from 1628 to his translation to the archbishopric of York in 1631.

Mr. Hooke mentioned, that he had invented an instrument of this kind, but upon another principle, which would perform the same things better, with more certainty and more ease.

He related also, that he had a theory, which would solve all the unequal motions of the planets; which he was desired to shew the society at their next meeting.

He brought in the rarefying-engine, fitted with a wooden vessel, large enough for a man to sit in, which was tried; but not being sufficiently tight, it was ordered to be fitted against the next meeting, and to be then tried.

The experiments appointed for the next meeting were,

1. That of opening the thorax of a dog :
2. Of the rarefying-engine :
3. An account of the convexity of the canal in St. James's Park :
4. Some magnetical experiments from Mr. BALLE.

July 18. There being but a small number of the society met, the experiment of opening the thorax of a dog was made by Dr. KING, but did not succeed, the apparatus not being fit. It was therefore ordered to be repeated at the next meeting, and Dr. KING was desired to bring in an account of that operation in writing, notwithstanding the failure of it.

July 25. Mr. BALLE presented a little book, entitled, *Historical Applications and occasional Meditations upon several subjects*, from an unknown hand, for the society's library.

Mr. Hooke brought in Mr. TOWNLEY's instrument for measuring diameters to very minute parts, consisting of a screw with indexes, &c. He reported, that Dr. CROUNE had a description and scheme of the instrument from Mr. TOWNLEY himself, which was ordered to be brought in and entered in the register^a; as also, that the operator should make one of the same kind to be kept in the repository.

Mr. Hooke produced likewise an instrument of his own invention for the same purpose, but of more plain and easy use, it consisting of two threads and a ruler, whereby an inch is diagonally divided into five thousand parts, and might be with the same ease divided into forty thousand or more at pleasure; to which was to be fitted part of a tube, whose circle is divided into 360 degrees, and a thread passing through the diameter, which would serve to find the true position of any star, &c.

^a It does not appear there.

It was ordered, that Mr. Hooke bring in an account of his instrument in writing, with a scheme of it, to be entered into the register-book; and that one of the same kind be likewise made to be kept in the repository.

Mr. Hooke mentioned, that he had another invention of an instrument to measure diameters with great exactness, which he promised to give an account of at the next meeting.

Report being made, that the great box fitted to the exhausting engine had not succeeded according to expectation, the air (as Mr. Hooke supposed) getting in at the brass-fucker, he informed the society, that he had since fitted it with a wooden-fucker instead of that; which would be ready against the next meeting.

Dr. WILKINS related, that by some experiments of this kind, which he had made long since at Oxford, it was found, that the air compressed in an engine would work through the pores of wood, though an inch thick; which he discovered by throwing water on the wood, wherein would appear many bubbles caused by the expression of the air from within.

To prevent which in this box Dr. KING advised, that it might be covered with a good fear-cloth made so, that it might keep the vessel tight enough to prevent any recourse of air. But Mr. Hooke replied, that he thought he had stoppt all possible passages of air with cement, so that it would now perform very well; and if this should fail, he thought there was no better way than to have it covered with lead.

Col. BLOUNT was of opinion, that a good Holland fear-cloth might hold and last better than leather, and that if it were well sized with glue, it might be to all intents as good as lead.

But it was objected by Mr. HENSHAW, that all sorts of fear-cloth will stretch, and the pores be opened by that subtle force.

He inquired likewise, whether it were fresh air or vapours, that came in upon exhausting the box? and was answered by Mr. Hooke, that at those times, when he sat in the box to make the experiment, all the difference, which he found, was only a little extraordinary heat.

Mr. Hooke moved, that since the cement about the engine was very subject to crack in the carriage from Gresham-college to Arundel-house, whereby it became defective, a committee might be appointed to see some experiments made with it at his lodgings in that college, and to report the same to the society.

Dr. KING brought in writing an account of several experiments made by him, viz. 1. Of bleeding a dog into a sheep. 2. Of a lamb into a fox, with some queries upon the same. 3. Some additional observations to his former account of the production of ants. 4. Of a cat dissected alive, to shew how long sense will remain

remain after the head is cut off. 5. Of a dog strangled, to be recovered by blowing into the aspera arteria with bellows; which experiment did not succeed. 6. Of a bitch dissected, which had been newly coupled with a dog. 7. Some observations in the late experiment of opening the thorax of a dog, which did not succeed. All these several experiments were ordered to be registered*, as follow :

“ *May 30, 1667.* 1. Having prepared a sheep and a dog for the experiment of transfusion, I took away blood from the sheep till she grew faint; then I supplied her with dog’s blood, till she was extream sick, and, as we judged, had received as much, if not more blood than she lost. Then we set her upon her legs, but she would not endure that posture, but lay down in such an agony, that we all feared she would die; and in regard we heard a violent clapping of the diaphragm, we were apt to think she was over stocked with dog’s blood, which made us resolve to let her blood, ten or twelve ounces, which we did, and the diaphragm presently ceased that vigorous clapping we heard before, and she took her breath much more freely; yet remained sick, and so continued two or three hours, but by the next morning was reasonably well, and did eat hay. So I sent her to graze, and she eat and seemed well six or seven days, but did not care to accompany with any other sheep; but in three or four days more droopt, and died. But by what I hear, her neck was ill looked to, and tainted, by reason of the heat of the weather and the injury of the flies.

“ I think it not amiss, to tell you, that a great part of this blood was transfused from the dog’s vein first, but with six times the trouble and pains I ever had before in this kind of experiment. The reason I take to be this: the day before the experiment was made, the dog had lost one of his jugular veins in another experiment I had not time to finish; and I happened to prepare the dog’s other jugular vein first, which being done, both the external jugulars were useless to him; which put him into so great a disorder, that we feared he would have died before the sheep could be made ready to receive his blood; and when we came to bleed him into the sheep, he bled freely a good while, but afterwards the blood was more apt to coagulate, than I had seen it; insomuch we were forced to open an artery to finish the experiment. Perchance the blood staying so long, as it were, imprisoned, did tend to coagulation before transfusion.

“ *June 9, 1667.* 2. I prepared a fox and a lamb for transfusion: the fox was but small and very poor, so that I durst not take above five ounces at first, before he had received some: then I bled the lamb into him, till he was extreamly short winded; then for fear of suffocation, I stopt the current of lamb’s blood, and perceiving the fox to continue very sick and short-winded, I took out about four ounces of blood more, of a much more florid colour, than the fox’s own blood was, before it was mixed. After that we fancied him tainter than before, and bled into him again, till we thought him incapable of receiving more without danger. But he continued very sick, as curst as before, and more apprehensive of being molested, a little after, than he was; and forsook

* Register, vol. iii. p. 194.

" all things he was used to eat or drink ; yet if a stick was held to him, he
 " would bark and snap at it with great fury : but after twenty-four hours, he
 " fell into a great trembling and grew faint, and died, and had some blood
 " come out of his nose when dead. Yet I think his vein was prepared with as
 " little trouble as any has been in any kind of experiment. Mr. BOYLE did me
 " the honour to be present at this experiment.

" Since I wrote this, I opened the fox, and contrary to expectation found the
 " thorax and abdomen half full of bloody water, or rather blood, and all the
 " vessels very turgid, and the very coats of the intestines seemed inflamed : so
 " that I believe there was much more blood put in, than was taken out,
 " though we did not think so. Perhaps the consideration of this great quan-
 " tity of blood, found in the thorax and abdomen, may prove worth the experi-
 " ment ; viz.

" 1. Whether the lamb's blood did so alter the quality and confidence of
 " the fox's blood, as to make it more thin and fine ; and so consequently make
 " his spirits more apt to fly away, whereby the tone of the vessels might be much
 " injured either by a relaxation, or by a different heat ; either of which perhaps
 " may weaken retention ?

" 2. Which may be more probable, whether (the veins being over full) the
 " arteries did not force out this blood at their own extremities, the veins not being
 " able to receive it ?

" 3. Whether the great turgency of both veins and arteries did not bereave
 " them of tightness and retention ?

" 3. The ants I observed did not begin to have the film I formerly spoke
 " of, till towards the end of May ; and then three or four hot days caused
 " the outward skin to dry and loosen from the body of the seeming maggot,
 " and become that bag, in which she is transformed into an ant, as afore-
 " said.

" 4. I repeated the experiment I spoke of, about a cat cut in two parts alive, just
 " cross about the diaphragm, and the hinder part shall answer to touch as distinctly
 " (as if it was whole and the head on) for eight or ten times or more ; being
 " pinch by the foot or tail, it shall kick and struggle, and then lie still, unless
 " you pinch or strike it ; and that many times distinctly, not accidentally. A dog
 " did the same.

" 5. I strangled a dog, till I could feel his heart beat very freely ; then I
 " clapt in the pipe of a bellows into the aspera arteria, but could not recover
 " life. I suppose the blood was coagulated in the brain.

" 6. I

“ 6. I dissected a bitch three hours after she had taken dog, but could not find any appearance of it in the uterus; it was very dry, but her testis were extremely swelled, and all the vessels very turgid.”

Col. BLOUNT related, that he had observed hog's wash to be very good feeding for fish, and therefore had ordered, that what was made in his house should be thrown into one of his ponds. But one time there being too much of it, the fish were suffocated, and some of them died; and he recovered the rest by letting fresh water into the pond.

At another time he put a dead horse into his pond, which putrefied the water so, that it killed above 300 tench; but he believed, that there might have been some drench or medicine in the maw of the horse, that might rather have been the cause of it, than the flesh itself. Those fishes, that were not dead, were recovered by him by throwing chopt parley into the pond.

He likewise mentioned, that a bushel of lime thrown into a pond of two or three acres would destroy all the fish; but that a good way to make fish thrive in a pond is, to drain the pond, and let it lie for some; then to sow wheat in the mud; and when that is grown to be about a foot high in the blade, to let in the water, and put in the fish, which will grow fat upon that feeding.

Dr. WILKINS remarked, that what is vulgarly called the stone in a carp's head supplies the place of lower teeth by rubbing their meat against it with their teeth, that are over it.

Mr. BALLE brought in one of the load-stones, which he had procured to be cut through in order to make it a terrella, which he was desired to get finished as soon as he could.

Dr. WILKINS related, that in his late journey to Exeter, meeting with Dr. COTTON, the latter told him, that he had found out a rock of load-stones in that country, and would furnish the society with one of any bigness they should desire.

Mr. BALLE undertook to speak with Doctor COTTON about it, when he should go into the country; and in the mean time he was desired to bring in a particular account of all such things in magnets, as the society might have occasion for in furnishing a magnetical repository. And Mr. HENSHAW, Mr. NEILE, and Mr. HOOKE were desired to join with him.

Mr. HOOKE moved to have a description of the place, where these load-stones were found, and to know how the poles lay in the earth, whether parallel to the axis, or after the manner of the dipping-needle, or parallel to any meridian; which might be known by taking the position of any stone there.

Mr. BALLE answered, that the place is twelve miles on this side of Plymouth in the road near Dartmouth, in a very high hill of near a mile ascent: That the
water

water standing there is like that of rusty iron : But with regard to the position of the poles, he had not thought of looking after that circumstance.

Dr. WILKINS remarked, that it was said, that the duke of FLORENCE's great magnet standing long in an undue position, viz. not north and south, had changed its poles.

Mr. HOOKE was of opinion, that metals and those mines were at first thrown up by earthquakes, though there are metalline waters, that crystallize, as is seen in the various figures in antimony and other metals ; but that gold is made by an extraordinary subterraneous heat, because it is always found in metal, not in ore. To which it was answered, that there is gold to be found in all metals.

Mr. BALLE presented a globous substance taken out of the stomach of an ox, which he had perforated, and found it, though hard without, yet to be full of hair within.

The lord BRERETON mentioned, that he had a stone, taken out of an ox, of substance like slate, solid and ponderous.

The experiment of opening the thorax of a dog made at the last meeting not having succeeded, it was ordered to be made again at the next ; and Dr. KING was desired to bring in writing an account of that whole operation, though it failed.

Mr. HOOKE and Mr. BALLE were earnestly desired to make the experiment of observing the convexity of the canal in St. James's Park, and not to fail of giving the society an account of it at their next meeting ; and Mr. NEILE was desired to procure leave from the duke of ALBEMARLE under his hand.

August 1. The society did not sit, on account of the absence of the president and vice-president.

Sept. 30. The meetings both of the council and society having been intermitted for some time, the council met this day in order to summon the society to return to their ordinary meetings, and for some other affairs. At this COUNCIL were present

The President

Mr. HENRY HOWARD of Norfolk
Sir PAUL NEILE
Dr. WILKINS
Mr. COLWALL

Dr. MERRET
Dr. CROUNE
Dr. BALLE
Mr. OLDENBURG.

It was ordered, that the society be summoned to meet again on the 3d of October following.

Mr. OLDENBURG acquainted the council, that in the name of the society possession had been taken of Chelsea-college * on the 27th of that month of September, by Mr. CHARLES HOWARD, Mr. BALLZ, Mr. HOOKE, and himself; and that two men were placed there to keep possession.

It being then mentioned, that a gardiner at Little Chelsea, a married man, was willing to live in the college, and to take care of the society's concerns there, and was likely to be content with a very reasonable allowance; it was ordered, that he should be spoken with by Mr. HOOKE, who knew him.

Mr. CHARLES HOWARD, whose presence at the council had been particularly desired on this occasion, received the thanks of the council for his favour of giving them a meeting, and was desired to take such order *pro tempore* about the house of Chelsea-college, and particularly about getting it fitted for a house-keeper, as he should think.

Mention being then made of another curator, the consideration of it was referred to the next meeting of the council.

Dr. WILKINS moved, that a committee both of the society and council might be considered of, for raising contributions among the members of the society, in order to build a college †.

It was ordered hereupon, that Dr. WILKINS should be desired to present to the council at their next meeting a list of such persons, as he should think proper for that purpose; which he undertook to do.

October 3. At a meeting of the SOCIETY,

There were presented two books, one from Mr. BOYLE (then at Oxford) by the hands of Mr. OLDENBURG, being a second edition of his treatise, intituled, *Of the Origin of Forms and Qualities*, with an appendix, containing, *Free Considerations touching subordinate Forms*: The other was from WALTER NEEDHAM, M. D. by the hands of Dr. WILKINS, intituled, *Disquisitio anatomica de formato sexu* ‡.

Sir MAURICE BERKELEY, kn^t was proposed candidate by Sir PAUL NEILE.

Sir WILLIAM CURTIUS was elected.

Mr. HAAK proposed a kind of mastic, affirmed to be made by ants in Franco-nia, sent out of Germany by Sir WILLIAM CURTIUS. It was wrapped up in two

* Dr. SPAAT in his *History of the Royal Society*, p. 434, observes, that this college had a large inclosure, which was designed by the society to serve for all experiments of gardening and agriculture; and that by the neighbourhood of the river they had excellent opportunity of making

all trials, that belong to the water.

† Dr. SPAAT, *ubi supra*, takes notice, that this college was intended to serve for the society's meetings, laboratory, repository, and library, and lodgings for their curators.

‡ Printed at London 1667, in 8vo.

papers, one of which contained grains of that mastic called by the presenter *undigested*; the other termed by him digested. It was accompanied with a description of both kinds, which was ordered to be registered *, as follows:

"In the two small sealed papers inclosed, I send you a specimen of our ant-mastic or frankincense, found hereabouts in *Sylva Ottonica*, which I gathered myself a few days ago upon a hill. That, which fell out new to my observation about it, was, that the *Materia prima ac indigesta* lay on the top of the ant-hill, like unto a paste, or a kind of manna; and therefore I did put that by itself, that you may the better try and compare it, as I did, with the true digested or concocted mastic or frankincense. Besides this, and to my amazement, I met with one huge heap, which, like unto a *Cippus exalte rotundus*, was raised about four foot and a half above ground and reached as far downwards into the ground, hollow: this I was loth to destroy or undo, intending hereafter to procure an exact and geometrical dimension of it. Belike, this place, inhabited by myriads of myrmidonian chymists, may be a special magazine of their elaborate and fragrant commodity, far surpassing that which is frequently obvious elsewhere. Perhaps, they within this cippus are under a kind of extraordinary forecast and industry, whereby they are more orderly employed, both to make and secure this their provision, (variously useful, no doubt, as well to themselves, as to men) within such a capacious circumvallation; for there are abundance of smaller and lighter heaps to be met with in those woods, affording but little substance; though one of my tenants tells me, that in another place, by following my direction, he lighted on a heap, where he got two large handfuls at once, which he made use of in his family, during the late contagion.

"So you see, Sir, there is no question to be made, but such a substance, viz. a kind of mastic or frankincense is found in these parts, among these (how-ever abject and contemptible) insects.

"As for the matter of it, I am persuaded, it is no other but the gum, that sweateth or is drawn out of fir-trees, abounding in these woods. The manner should be inquired into; viz. whether this said gum be digested or alembiced by a peculiar and innate aptness of these insects; as we see and observe the bees have, for making their wax and honey: Or whether the gum comes to be thus coagulated by the warmth of their little cells and caverns; as in a petty kind of stoves. The chemical operators will best be able to trace the progress. *Vos omnia trutina exaltiori et ingeniosiori pensabitis.* The first or rawer sort doth hiss in the fire, *et ita prodit partes aquosas ibi restantes*; whereas the other refined sort doth melt like the oriental mastic; and for my part, I can discover but small difference in either its smell and fumigation, or its operation; viz. that it induceth a gentle desiccation."

Mr. OLDENBURG communicated two papers sent him out of the country, one containing an account of the tin mines of Devonshire and Cornwall by Mr. SA-

MUEL COLEPRESSE; the other an account in Latin, dated Sept. 29, 1667, of several particulars given by Mr. JOHN BURTON of Scarning in Norfolk, viz. of a Turkey hen having swallowed several pieces of English coin found very smooth in her maw; of a petresying water in Norfolk; and of a moveable hillock in a stagnant water^r.

Mr. COLEPRESSE's papers about the tin-mines being large were given to be perused and considered by Mr. BALLE and Dr. CROUNE, and they were desired, according as they should find them, either to make an extract of them, or to commend them to be read before the society, as they were.

Sir THEODORE DE VAUX brought in a paper about the refining of sugar, which was ordered to be registered^a; and Mr. HAAK and Mr. THOMAS COXE were desired to join together for bringing in a full account of the history of the refining of sugar; which they undertook to do.

Mr. CHARLES HOWARD suggested, that it might be considered, whether maiz might not yield a kind of sugar, the stalks of it containing a very sweet juice; and he desiring, that he might be furnished with an account of the way of ordering the sugar-canes for the making of sugar, Mr. OLDENBURG offered an account of that subject, which he had been furnished with by an ingenious English merchant, Mr. DRAKE, who had lived in Barbadoes many years, and carefully observed himself the method of sugar-making. This account was ordered to be communicated to Mr. HOWARD.

Mr. OLDENBURG produced a letter to himself from Signor MANFREDO SEPTA-LIO, a curious gentleman at Milan, dated there Aug. 1667, N. S.^a, containing some communications about cockle-shells digged out of a hill in Italy, and about quicksilver found at the root of the plant *Doronicum*.

This gentleman taking himself to be received into the society upon a letter written to him by Mr. OLDENBURG 2d of June, 1667^a, to invite him to a correspondence, it was moved, whether he should be proposed for a candidate, he appearing so desirous to be a member of the society; but it was thought fit to defer this business till the next meeting.

Mr. OLDENBURG produced a box sent him by Mr. COLEPRESSE, containing some curiosities, which were ordered, to be put into the repository, viz. a monstrous chick; some black stones, which being lighted will flame, and the fume of which was affirmed to be medicinal for several distempers; two stones brought from the sea-side full of little cells, and those cells of little shell-fishes; and two warming stones, one smooth, the other rough, with an account of the improvement of their uses. The description of all these particulars was ordered to be filed up.

^a Supplement to the Letter-Books, vol. ii.

^a Letter-Book, vol. ii. p. 41.

p. 71.

^b Ibid. p. 33.

^c It does not appear in the Register.

Dr. CROUNE moved, that Mr. GASCOYNE's instrument, sent by Mr. TOWNLEY, and produced at a former meeting before the society, for the dividing of an inch into many thousand parts, might be taken into farther consideration; and that himself might be directed, what answer to return to Mr. TOWNLEY concerning it. Upon which it was ordered, that the instrument should be produced again at the next meeting.

And Mr. HOOKE mentioning, that he had contrived an instrument for the same purpose, and performing it with more conveniency, and to be made with more ease and for less charge, he was desired to produce that contrivance at the next meeting; which he promised to do.

Mr. PACKER moved, that an engine might be considered more convenient and proper to make cyder, than that which is now employed for that purpose; and mentioning, that he understood, that Mr. HOOKE had thought upon such a one, capable by one motion to break the apples, to put aside the husks, and to cause the liquor to run out, the society desired Mr. HOOKE, that, if he had such a contrivance, he would bring in a model of it as soon as he could: which he promised to do.

The experiment appointed to be made at the next meeting by Mr. HOOKE was the opening of the thorax of a dog, to blow with bellows into his lungs, and thereby to keep him alive: which experiment might conduce to the discovery of the nature and use of respiration. The operator was ordered to provide a dog for this purpose.

Mr. HOOKE was likewise ordered to prosecute the experiments in the rarefying engine capable of holding a man; as also to endeavour to make the experiment for measuring the compass of the earth, moved so long ago, and pressed so often, to be performed in St. James's Park.

Octob. 10. Mr. JOHN COLLINS, accountant to the excise-office, and RICHARD LOWER, M. D. were proposed candidates by the bishop of Salisbury*, and Col. BULLEN REYMES by Mr. EVELYN.

Dr. WILKINS presented from Mr. SPRAT the *History of the Royal Society*†; and hearty thanks were ordered to the author for his singular respect to the society shewed in that book.

The

* Dr. SETH WARD, translated from the bishoprick of Exeter to that of Salisbury, 12 septemb. 1667.

† Mr. OLDENBURG is a letter to Mr. BOYLE dated at London, Nov. 23. 1664, printed in Mr. BOYLE's works, vol. v. p. 325. had, upon reading the manuscript of this *History*, remarked, that "he knew not whether there was enough said in it of particulars:" and in a letter of the

21st of Oct. 1667, (Mr. BOYLE's works, p. 367.) he has another passage on that subject after this *History* was printed, and ready for publication: "There is a certain gentleman, a florid writer, one of our royal collegiates, who intends to print shortly some paralipomena relating to the history of our society; wherein he means to take more notice of the performances of some eminent members thereof, than hath been done
" by

The experiment of opening the thorax of a dog was made by Dr. Lower and Mr. Hooke, which succeeded well, as it had done formerly, according to the account already registered of it. Sir GEORGE ENT reflecting upon this experiment, said, that it shewed what was not the use of respiration, but not what it was : that the lungs not beating at all, but only kept extended with fresh air blown in by bellows, shewed, that the lungs did not serve to promote by their agitation the motion of the blood. Mr. Hooke considered, that the dog being continually supplied with fresh air was kept alive, but was ready to die, if either he was left unsupplied, or his lungs only kept full with the same air, and thence conceived, that the true use of respiration was to discharge the fumes of the blood.

Dr. CROWE produced Mr. GASCOYNE's astronomical instrument sent by Mr. TOWNLEY for the view of the society, who judged it to be a very ingenious and useful contrivance, and desired the doctor to request Mr. TOWNLEY to leave it

by Mr. SPRAT, and farther to recommend and vindicate the modern experimental philosophy, by representing the advantages of this way of trials, both for light and use, above that of former times. It had been extant, I find by his letter, ere this ; but that he stayed for Mr. SPRAT, to see what room he would leave for his thoughts, and finding now, that he hath not throughout prevented him, he seems resolved to pursue his design, though it will not make above half a dozen sheets, and therein to acknowledge some grand contributions to philosophy, that have been omitted by the other. This is but just, and hath therefore received encouragement from me, together with the suggestion of some particulars, which this author could not be acquainted with so well as the suggestor." This author was evidently Mr. JOSEPH GLANVILL, rector of the great church of St. Peter and St. Paul in Bath, and the book, which he was composing, his *Plus ultra* : or, the progress and advancement of knowledge, since the days of ARISTOTLE ; in an account of some of the most remarkable late improvements of practical useful learning, printed at London 1668 in 8vo. This treatise and Mr. SPRAT's *Histo-ry of the Royal Society* gave great offence to Mr. HENRY STURGE, the physician, of Warwick, who took occasion thence to attack that society with uncommon virulence and scurrility of language, charging the members not only with bringing contempt upon ancient and solid learning, especially the Aristotelian philosophy, but likewise with undermining the universities, destroying the established religion, and introducing popery in its stead. These charges he attempts to support in his several pieces against Mr. SPRAT and Mr. GLANVILL, with the titles of which the readers of the present age will perhaps be fully satisfied. Against the for-

mer he published *Legend, or Histories : or, a Specimen of some Animadversions upon the History of the Royal Society*, London 1670, in 4to. *Censure on certain Passages contained in The History of the Royal Society*, printed at Oxford the same year in 4to. *Campanilla revivida : or, an Inquiry into The History of the Royal Society* : London 1670, in 4to. And a *Reply unto the Letter written to Mr. HENRY STURGE in defence of The History of the Royal Society* : Oxford 1671, in 4to. His pieces against Mr. GLANVILL are intitled, *The Plus ultra reduced to a non plus : or, a Specimen of some Animadversions upon the Plus ultra of Mr. GLANVILL, wherein sundry errors of some virtuoso are discovered, the credit of the Aristotelians in part re advanced, and enquiries made about the advantages of the ancient education in England above the new and mechanical, &c.* printed at London 1670, in 4to. *A Preface against EPIROTIUS (alias JOSEPH) GLANVILL, fellow of the Royal Society*, printed at the end of his *Reply unto a Letter written to Mr. HENRY STURGE*. Even in his letters to Mr. BOYLE, to whom he was greatly obliged, and for whom he professed a high esteem, he could not forbear his invectives against the Royal Society, as appears from three of those letters written in Decemb. 1669, and in May and June 1670, printed in the *life of Mr. BOYLE* prefixed to his works, and reprinted in 8vo. Mr. GLANVILL replied to him in his *prefatory answer to Mr. HENRY STURGE, the doctor of Warwick, wherein the malignity, hypocrisy, and falsehood of his temper, pretences, and reports, &c. in his animadversions on Plus ultra are discovered* : London 1671, in 8vo. And in *A further Discovery of Mr. STURGE in a brief Reply to his last Pamphlet against JOSEPH GLANVILL* : London 1671, in 8vo.

with them, and to procure such another to be made at their charge by the same artist, who made this.

Mr. HOOKE produced likewise his instrument for the same purpose, but made with far less charge, and performing the same thing with more ease. He was ordered to have such a one made for the society, and to bring in a description of it, and its use.

Mr. BALLE being called upon for Mr. COLEPRESSED's papers concerning the tin-mines referred to him and Dr. CROUNE at the last meeting, said, that the doctor having been out of town, they had not yet had the opportunity of considering them together. Dr. MERRET mentioning, that he had cast an eye upon them, moved, that they might be compared with those papers, which had been already given in upon the same argument. He was desired therefore to undertake that task, and having compared the several accounts together, to inform the society how far they agreed, and wherein they differed, and which of them was the fullest; and in case there was any disagreement, to extract the particulars of it for farther inquiry. Dr. MERRET promised to do this, and the amanuensis was accordingly ordered to let him have the register-book, wherein those papers concerning the said mines are entered.

Sir THEODORE DE VAUX produced three several papers concerning sugar; one of sugar-candy; the other about the refining of muscovade, and reducing it into loaves; the third containing several queries about sugar. The papers were delivered to Mr. HAAK and Mr. HOOKE to peruse them, and to consider of what use they might be for the history of sugar-woks.

He gave in likewise a paper concerning the way of making both soft and hard soap; which was recommended to the perusal of those members, who had undertaken to bring in the history of soap-making; and of whom Mr. HOOKE was one.

Sir THEODORE desiring, that the papers formerly brought in by him about coloration might be called for, and the members, who had undertaken the translation of them into English, spoken to about it, Mr. OLDENBURG said, that some of those papers were already translated; but that those, which were committed to the care of Dr. QUATREMAIN and Mr. DANIEL COXE, were not yet accounted for; and that Dr. QUATREMAIN being since dead, those persons, who knew how his effects were disposed of, might be desired to inquire after that part of the said papers, which was referred to him.

It was desired likewise, that those persons, who had formerly engaged in the bringing in of the histories of trade, would be mindful of their engagements; as particularly Mr. CHARLES HOWARD of tanning, both the old and new way; Mr. HOOKE of soap-boiling and hat-making; Mr. HILL of paper-making; Mr. HOOKE and Mr. THOMAS COXE of sugar refining, &c.

Mr.

Mr. OLDENBURG produced a paper sent him by Mr. GLANVILL about the Mendip-mines, in answer to some of the printed queries about mines : which paper was read, and ordered to be registered*, and Mr. GLANVILL was desired to prosecute those inquiries.

Dr. LOWER offered to make at the next meeting the experiment of breaking the nerves of the diaphragm in a dog, to make him broken-winded ; and the operator was ordered to provide a dog for that purpose.

It was ordered, that Dr. BALLE, Mr. COLLINS, and Mr. OLDENBURG take care of making a catalogue of the library of Arundel-house.

Octob. 17. Sir MAURICE BERKELEY, colonel REYMES, Dr. LOWER, and Mr. COLLINS were elected ; and Dr. LOWER likewise admitted.

Sir NICHOLAS STEWART, bart. was proposed candidate by the bishop of Salisbury ; HENRY CLARKE, M. D. by Mr. GRAUNT ; and Monsr. THEODORE DE BERINGHEN by Mr. AERSKINE.

The experiment ordered at the last meeting to be made at this was made accordingly by Dr. LOWER, who by piercing both sides of a dog, and cutting two nerves passing towards the diaphragm, made the dog broken-winded. He was desired to bring in at the next meeting a full description of this experiment, which he promised to do.

Some reflections being made on this experiment, it was taken notice, that as this trial shewed one of the causes of short-breathing, so there was another, viz. the stoppage of the lungs by a viscous humour in the pipes.

The experiment made at the former meeting, of preserving a dog alive by blowing into his lungs with bellows, and keeping the lungs extended by a constant supply of fresh air, being again considered of, it was observed by Mr. Hooke, that this experiment seemed to shew, that an animal might be kept alive without any motion of the lungs, only by a continued supply of fresh air ; and that the motion of the lungs did not contribute to the circulation of the blood. He was desired to bring in an exact description of this experiment, as it was now improved.

It was also moved, that it might be considered, whether it was the emission and discharge of fumes, or the intromission of fresh air, that preserved the animal alive.

* It does not appear in the register, but is printed in the *Philos. Transact.* n° 28. p. 515. for Octob. 1667.

Several

Several members were put in mind of the tasks undertaken by them of bringing in histories of trades; and Mr. HILL being called upon among others promised to bring in an account of paper-making at his next attendance at the society.

The translation of Sir THEODORE DE VAUX's paper about refining of sugar was ordered to be brought in at the next meeting.

The paper about soap-making given in by Sir THEODORE DE VAUX was delivered to Mr. HOOKE, who undertook to give an account of that trade.

It was ordered, that Dr. MERRET be called upon at the next meeting for Mr. COLYPRESSÉ's account of tin-mines, which he promised to compare with those formerly given in to the society.

Mr. OLDENBURG moved, that the experiment of transfusion of blood might be prosecuted and considered, in order to try it with safety upon men, it having been already practised at Paris. This was recommended by the president to the consideration of the physicians.

The experiment appointed for the next meeting, upon the suggestion of Mr. HOOKE, was that of making the blood of an animal pass from one side to the other out of the vena arteriola into the aorta, without passing through the lungs. Dr. LOWER and Mr. HOOKE were desired to take care of this experiment.

Octob. 24. Dr. THOMAS WILLIS and Mr. COLLINS were admitted.

Sir NICHOLAS STEWART and Monsr. THEODORE DE BERINGHEN were elected and admitted.

Dr. HENRY CLARKE was elected.

A magnetical experiment was made seeming to shew, that the poles of the magnet attract as well as direct: and it was ordered to be repeated at the next meeting in a larger box closed with glass; and an account of it was directed to be brought in by Mr. HOOKE.

Dr. LOWER's account of the experiment of making a dog broken-winded was read, and ordered to be registered¹; and he was desired to try, whether the bare perforating the diaphragm would not have the same effect.

Mr. HOOKE's account of the experiment of keeping a dog alive by blowing into his lungs, and even without the motion of his lungs, only by keeping them extended with a constant supply of fresh air, was read, and ordered to be registered².

¹ Register, vol. iii. p. 200. It is printed in the *Philos. Transact.* n.º 29 p. 544 for Nov. 1667.

² Register, vol. iii. p. 203. It is printed in the *Philos. Transact.* n.º 28. p. 539.

Mr. HENRY HOWARD presented to the society for their repository an excellent mummy.

Dr. LOWER related the success of the experiment, which he had both invented and actually tried, of giving a drop of to a dog in a very few hours by tying up the vena cava. He was desired to give an account of it to be registered, and likewise to make it before the society at their next meeting, Dr. KING assisting him in it.

The method of transfusing blood into a man, as it was contrived by Dr. KING was read, and ordered to be registered ^b.

It being moved, that the experiment might be made accordingly, as it had been done already in foreign parts, Sir GEORGE ENT suggested, that he thought it most advisable to try it upon some mad person in the hospital of Bethlem. This being seconded by divers other physicians of the society, Dr. LOWER, Dr. KING, Mr. THOMAS COXE, and Mr. HOOKE were desired to speak with Dr. ALLEN, physician to Bethlem, about the execution of this trial, and to let him know the opinion declared in the society concerning it; which they undertook to do.

Mr. COLLINS presented the society with an excellent double horizontal dial, containing some new additions to that instrument; as also several books, of which he was the author, viz. 1. *A Treatise of Geometrical Dialling*^a. 2. *The Sector or a Treatise containing the description and use of four several quadrants, &c.*^a 3. *The Mariners plain Scale new plain'd*^a. 4. *An Introduction to Merchants Accounts*^a. 5. *The Doctrine of decimal Arithmetic, simple Interest, &c. as also of compound Interest and Annuities, generally performed for any time of payment, &c.* in one printed sheet in 8vo^a. Besides these he presented REMMELINI's anatomical cuts. He was desired to give in writing an account of what was peculiar in the horizontal dial, which he promised to do.

Dr. MERRET gave an account of Mr. COLEPRESSED's papers on the tin-mines, declaring, that they contained divers considerable particulars, concerning which some remarks had been communicated before, with which Mr. COLEPRESSED's agreed; and that others were new, and deserved to be read before the society.

Mr. POVEY promised to send in the skeleton mentioned by him formerly, and to give in writing the method of laying on colours with eggs beaten up with any part of a fig-tree.

The experiments appointed for the next meeting were,

^a Register, vol. iii. p. 205. It is printed in the Philos. Transact. n° 28. p. 522.

^b Printed at London 1659.

^c Printed at London 1658 in 4to.

^d London 1659 in 4to.

^e London.

^f London 1664.

1. The magnetical experiment, mentioned above, to be reported by Mr. HOOKE.

2. The blood of a dog to be passed out of the vena arteriosa into the aorta, without passing through the lungs, by Mr. HOOKE.

3. To give a dropsy to a dog by tying up the vena cava; first to be tried privately, and then in public.

4. To pierce the diaphragm of a dog, to see whether that alone would make him broken-winded.

5. The rarefying-engine.

Obs. 31. WILLIAM AGLIONBY, M.D. was proposed a candidate by Sir ANTHONY MORGAN.

JOHN WRAY*, M. A. was proposed a candidate by Dr. WILKINS.

Mr. EVELYN presented the society with his wooden tables, having the veins and arteries of human body fixed on them.

Dr. LOWER gave an account of the experiment, which he had again made, of tying up the vena cava of a dog, and thereby giving him the dropsy; whereupon the animal died in four or five hours after. He was desired to give this account in writing, in order that it might be registered, which he promised to do.

Dr. CLARKE took notice, that Dr. LOWER had also made an experiment of tying both the external jugulars of a dog, and thereby making his head swell exceedingly, and look very clear: which experiment Dr. LOWER was desired to make before the society.

Dr. KING related, that having, upon Dr. LOWER's suggestions, tried the experiment of tying up the vena cava of a dog, it succeeded not with him, it being his first trial of this experiment; and that the dog dying the next day, and being opened, he found the cava but half tied. He was desired to bring in an account in writing of this experiment, and of the observations, which he discoursed of to the society upon this experiment, as they were hinted to him by Dr. LOWER.

Dr. LOWER mentioned, that the breaking of the receptacle of the chyle would make the lungs adhere to the sides of the animal in less than a day's time. He was desired to shew this to the society.

Mr. HOOKE produced two instruments of his own contrivance; one called by him a perfect wheel-work, so made as equally to communicate the strength of

* He afterwards discarded the initial W in See his letter to Dr. LESTER 22 August, 1670, among his Philosophical letters, p. 72.

the first wheel to the last, the teeth of it being always taking, so as before one tooth had done taking, it was passed a good way into another. The other was an instrument for observing the diameters, positions, and angles of the stars, conceived to be more plain, easy, and less chargeable than that of Mr. TOWNLEY. He was desired to bring in an account of both in writing, and to take care, that Mr. TOWNLEY, who had before communicated to the society an instrument for the like purpose, might be made acquainted with this new contrivance.

The magnetical experiment, which was tried at the last meeting with a seeming success, was tried again at this, but did not succeed at all. Mr. HOOKE was desired to give an account of this in writing, the unsuccessful experiments being as well to be registered, as those that succeeded.

Mr. COLLINS brought in a narrative of the making of salt in Cheshire, which he said was imparted to him by a person very well experienced in that practice. It was read, and a copy of it ordered to be given to the lord BRERETON, to be perused by him, and enlarged with such observations, as he formerly promised to communicate to the society upon the same subject.

Mr. COLLINS likewise moved, that some queries might be drawn up concerning this matter, which he would recommend to the person, who had given the account abovementioned, and whom he thought very well able to answer whatever should be inquired of upon that subject. Mr. HOOKE was desired to draw up such queries.

A report being made of Dr. ALLEN's scrupling to try the experiment of transfusion upon any of the mad people in Bethlem-hospital, it was ordered, that he should be desired by Mr. HOOKE to give a meeting at Sir GEORGE ENT's house on the Monday following to some of the physicians of the society, as Sir THEODORE DE VAUX, Dr. CLARKE, Dr. LOWER, Dr. BALLE, and Dr. KING, to consider together, how this experiment might be most conveniently and safely tried.

Mr. SKIPPON presented a kind of scaribæus brought from Turkey, where falling into a vessel of turpentine, it was thereby preserved.

The experiments appointed for the next day were

1. That of passing the blood of a dog from one side to the other, without its motion through the lungs.

2. Of tying up both the jugulars of a dog, to make his head swell.

November 5. At the meeting of the COUNCIL were present

The

The President

Mr. AERSKINE
 Sir ANTHONY MORGAN
 Dr. WILKINS
 Dr. MERRET
 Dr. CLARKE

Mr. COLWALL
 Mr. HOSKYNs
 Dr. BALLE
 Mr. OLDENBURG.

Sir ANTHONY MORGAN gave an account of the state of the patent concerning the grant of Chelsea-college, viz. that the business stuck at the commissioners of the treasury. It was ordered hereupon, that the solicitor of this business should be addressed by Sir ANTHONY MORGAN to Sir PAUL NEILE, and he be desired to employ his interest with the lord ASHLEY for a dispatch.

The business of the house of Chelsea-college being taken into consideration, it was agreed upon, that Mr. CHARLES HOWARD should be desired by the secretary to agree about a yearly allowance with the man formerly recommended by Mr. HOOKE as a fit inhabitant of the said house; as also to give order for such reparations, as should be by him thought necessary to lodge the said house-keeper conveniently.

The business of voluntary subscriptions for contributing towards the carrying on of the ends of the institution of the Royal Society being considered of, it was after debate and mature deliberation unanimously agreed upon,

That it was now a seasonable time for such subscriptions; and that they were to be made first by such of the council and of the society, as were both willing and able, and afterwards by such other well disposed persons not of the society, as should come in by the solicitation of a committee to be nominated by the council out of their own number, and out of the fellows of the society; which contributions should be employed in promoting the ends of the society, and particularly to the building of a college, as the most probable way of the society's establishment.

In order to this, a form of subscriptions was drawn up as follows :

“ We, whose names are underwritten, being satisfied of the great usefulness of
 “ the institution of the Royal Society, and how requisite it is for attaining the
 “ ends designed thereby, to build a college for their meetings, and to establish some
 “ revenue for discharging the expences necessary for trial of experiments, do
 “ heartily recommend it to the bounty of all generous and well-disposed persons
 “ for their assistance to a work of such public usefulness; and we do each of us,
 “ for ourselves, hereby promise to contribute to those good ends the respective
 “ sums subscribed by each of us, at four distinct quarterly payments, to be made
 “ to such persons, as shall be authorized under the seal of the Royal Society for
 “ the receipt thereof; the first payment to begin at——.”

This.

This form was committed to Sir ANTHONY MORGAN and Mr. HOSKYNs to make it obligatory in law.

They were likewise desired to draw up a deed of gift of the library presented to the Royal Society by Mr. HENRY HOWARD of Norfolk.

It was moved by Mr. COLWALL, that some effectual way might be taken by the council to oblige the fellows of the society to pay their arrears: Whereupon it was ordered,

That Mr. COLWALL the treasurer should write to the several members of the society, who were in arrears, and signify to them, that their positive answers concerning their payments were expected by the council within one month from the time of the receipt of the respective letters sent to them for that purpose, or from the time of their being left at their respective houses or lodgings: And that, in case of failure, the council would think themselves obliged, after so long delays, to proceed with them according to statute, and so to leave them out of the list of the society.

It was mentioned by Mr. OLOENBURG, that Sir PAUL NEILE had spoken to him, that Mr. ADRIAN MAY had desired, that the society would give order for a good thermometer for the use of the Queen. It was ordered, that the operator should make as good a one as he could.

The business of cataloguing the society's library being spoken of, Dr. BALLE acquainted the council, that in a short time that catalogue would be perfected.

It being represented to the council, that it was very necessary to have another curator, and Dr. LOWER being proposed as a person very fit to be a curator in anatomical experiments*, Dr. WILKINS was desired to speak with him about it.

It being moved, that a boy might be allowed to Mr. HOOKE, fit to be employed by him on such occasions, as concerned the service of the society, it was agreed upon by the council, that Mr. HOOKE should find out such a boy, and that fifteen pounds a year should be allowed him towards the keeping of him.

Dr. WILKINS moved, that Mr. COLLINS might be declared exempt from the payment of admission-money and the weekly payments, he having but a small revenue, and being capable and willing to do the society very good service. The council declared him exempt accordingly.

* Mr. HOOKE in a letter to Mr. BOYLE dated at Gresham college Sept. 5, 1657, and printed in Mr. BOYLE's works, vol. v. p. 548, says, "I hope I shall prevail upon Dr. LOWER, and for him, so as to get him anatomical curator to the society. He has most incomparable dif-

"coveries by him on that subject, and a most dextrous hand in dissecting. Some of his discoveries, I understand, will be published in the next edition of Dr. WILLIS's book de *Cerebris*."

Mr.

Mr. OLDENBURG read the Latin letter, which he had drawn up to be sent to Prince LEOPOLD of Florence; which was approved of, and ordered to be sent to the said Prince in the name of the society, subscribed by Mr. OLDENBURG^b, and addressed to Sir JOHN FINCH^c, and accompanied with a copy of the *History of the Royal Society*, as a present from them to the Prince.

Mr. OLDENBURG had leave to send a copy of that history to Mr. HEVELIUS, another to Mr. WINTHROP in New England, and a third to Monsr. AUZOUT and Monsr. PETIT at Paris.

A committee consisting of the president, both the secretaries, Mr. HOSKYNs, and Mr. BALLE, was appointed to examine the treasurer's accounts; who was desired to state them as soon as he could.

November 7. At a meeting of the SOCIETY,

Col. REYMES and Dr. HENRY CLARKE were admitted:

Mr. WRAY was elected and admitted:

Dr. AGLIONBY was elected.

Dr. LOWER made the experiment of tying up both the external jugulars of a dog, whereupon the animal after a little time somewhat drivelled and wept. He remarked, that a dog being well fed before, these effects would be much more remarkable, and the dog would die about two days after the experiment was made upon him, with his head swelled, and looking clear, if it be an old dog; for in a young one it would not succeed.

This experiment was ordered to be repeated in private two days before the next meeting of the society, that the dog might then be produced dead, to see that swelling and transparency.

It was likewise ordered, that the experiment of piercing the diaphragm of a dog, without cutting any nerves, be made at the next meeting by Dr. LOWER, to see, whether that alone would render him broken-winded.

Mr. HOOKE speaking again of his experiment of passing the blood of an animal out of one side to the other without its passing through the lungs, and shewing his contrivance for performing it, was ordered to try it first in private; and lest there should fall too much air upon the blood, moving openly into the porrerger from one side to the other, it was suggested, that a kind of cover should be prepared for the porrerger to regulate the quantity of the air.

^b It was dated 25 Nov. 1667, and is entered in the Letter-Book, vol. ii. p. 105.

^c Mr. OLDENBURG's letter to Sir JOHN FINCH

dated 26 November 1667, is entered in the Letter-Book, vol. ii. p. 104.

Mr. COLEPRESSE's observations on the tin mines of Devonshire and Cornwall were read, and ordered to be registered^a.

Mr. COLLINS communicated his description of the double horizontal dial, which he had presented to the society October 24, and it was ordered to be read at the next meeting, and the dial itself then brought to the society.

He presented likewise two sheets of printed quadrants.

It being moved, that the scheme and description of Mr. TOWNLEY's astronomical instrument should be brought in by Mr. HOOKE, and entered, answer was made, that both were ready and in the hands of the secretary, who promised to produce it at the next meeting.

Mr. HOOKE being called upon for the scheme or model of the new instrument for making cyder, and not having it ready, was desired to produce it at the next meeting.

Dr. BALLE presented an eagle-stone, and an helmet-stone for the repository.

Dr. LOWER being called upon for the written account of the experiment of giving a dog a droply by tying up the vena cava, excused the not bringing it in, by alleging, that he intended shortly to give a large account of it by the press^b.

Dr. KING likewise being called upon for his account of what he mentioned at the last meeting to have been tried of the like nature by Dr. LOWER's directions, referred himself to what Dr. LOWER intended to discourse on that subject.

Sir THEODORE DE VAUX brought in a paper giving an account of the practice of making and refining salt, which was read, and a copy of it ordered to be communicated to the lord BRERETON for his perusal, enlargement, and (if he should see cause) correction.

November 4. Dr. AGLONEY was admitted.

Sir CHARLES BERKLEY, knight of the Bath, was proposed candidate by Dr. WILKINS; WILLIAM SOAME, esq; by Sir ANTHONY MORGAN, and NICHOLAS OUDART, esq; by Sir THEODORE DE VAUX.

Mr. OLDENBURG communicated a letter to him from Mr. HEVELIUS dated at Dantzick October 21, 1667^c, wherein the writer gave notice of his *Cometographia* being almost finished; and expressed his desires, both of having one of the longest telescopes, made in England, provided for him, and of being gratified with a full

^a Register, vol. iii. p. 206. This paper is printed in the *Philos. Transact.* vol. vi. n^o 69. p. 2096. for March 1671.

^b He did not execute his intension in that respect.

^c Letter-Book, vol. ii. p. 53.

description, formerly promised him by Mr. Hooke, of the way of applying tele-copical sights to sextants, thereby the better to regulate and assist the sight in the mensuration of the distances of stars. Which requests of his the society thought should be complied with as far as possible; and particularly desired Mr. Hooke to be mindful of his promise concerning those sights.

Dr. Lower gave an account of his having two days before, according to a former order, made the experiment of tying up both the external jugulars of a dog, to see whether his head would swell and look clear, and the dog die two days after. But he said, that the dog being young, the experiment did not succeed, as he had foretold it would not. Whereupon it was ordered, that the operator should provide an old dog for the Tuesday following, such a one being esteemed a proper subject for this experiment, in regard his vessels were hard, and not liable to stretch, as those of young animals.

He gave an account of the experiment of perforating the diaphragm of a dog without cutting any nerves, and remarked, that after this was done, the animal breathed as well as before, the wound being sewed up.

He mentioned another experiment, which he had tried of making the blood circulate another way, viz. from the jugular artery to the jugular vein on the same side, which, he said, succeeded so well, that the blood being thus made to circulate, the dog continued well. This experiment was ordered to be tried before the society at their next meeting.

Mr. Hooke related, that his experiment of making the blood of a dog pass from one side to the other, without passing through the lungs, had not succeeded in the way hitherto contrived by him; but that he had thought of another method, which he would farther consider of.

He was desired to give in writing all the particulars of the operation, and what hindered the success.

Dr. Lower was likewise desired to bring in writing an account of his three experiments abovementioned.

Dr. Lower's account of his experiment, tending to prove, that the ductus chyloferus is the only passage, by which the chyle is conveyed out of the stomach and intestines into the heart, was read, and ordered to be registered*, as follows:

“ *Hæc quidem via sola est, quæ chylus è ventriculo et intestinis in ipsum sanguinem et cor infunditur, neque enim alius ei aditus a naturâ datur. At siquidem celebres aliqui viri in eo adhuc errore versantur, ut venas mesaraicas (quod antiquum sanguificationis munus hepatis asserant) aliquam chyli partem ex intestinis excipere statuant; ut de hæc re certior fierem, seriam aliquando impendi*

* Register, vol. iii. p. 224.

“ operam, atque expetimento tandem mihi consiliit, totum chyli penu per ductus
 “ tantum chyliferos et nullibi aliter in sanguinem infundi, eique committeri. Si
 “ enim curfus ejus per vasa thoracica impediatur, animal, quicunque licet cibo
 “ saginatum, intra paucos dies fame penitus interibit, quod quidem in duobus
 “ canibus, diverso licet modo, expertus sum: siquidem in alreto, thorace dextri
 “ lateris juxta spurias costas aperto, digitum immisi, et commune receptaculum
 “ chylo valde turgidum peritegi et laceravi, ut chylo, in cavitatem thoracis, exitu
 “ dato, transitus ejus in ductus thoracicos penitus interciperetur. Quo facto, con-
 “ suto et curato vulnere, animal hoc, cibo bis aut ter in die satiavi; die quarto
 “ expiravit; statim autem dissecui, ventriculum et intestina valde repleta, quin-
 “ etiam venas lacteas omnes chylo plenas inveni; nihil autem ejus in toto ductu
 “ thoracico apparuit: verum in eo pectoris latere, in quo commune receptaculum
 “ disruptum est, ferè duæ libræ chyli reperiæ sunt, unde certò constare arbitror,
 “ ob prædeditum chyli transitum animal hoc, ventriculo licet cibus referto, fame
 “ utcumque periisse.

“ Quod tamen ut certius redderem, alium canem simili modo, sed in adverso
 “ et sinistro latere intra tertiam et quartam costam superiorem periodi, è cujus
 “ regione ambo ductus chyliferi in unum truncum coeunt, qui deinceps ex latere
 “ œlophagi inferiore versus venam subclaviam incedit. Immisso itaque in vulnus
 “ digito, unguis apice velut in ferram resecto, ductum istum disrexi, quo quidem
 “ disrupto chyli in cavitatem thoracis effluere, ulterius vero penetrare neutiquam
 “ potuit. Quare vulnere, ut prius, curato canem per tres vel quatuor dies bene
 “ passum detinui, ex quo tempore elangescere cepit, ac paulo post obiit. Cum
 “ vero thoracem ejus dissecarem, pectoris latus illud, ubi ductus iste disruptus fuit,
 “ chylo repletum, et lobos omnes pulmonis intra hanc cavitatem ab inundante
 “ chylo compressos et lateri agglutinatos inveni. Quò autem certior fierem, cana-
 “ lem istum usque adeo disruptum esse, ut nihil chyli ulterius transferre potuerit,
 “ commune receptaculum chylo adhuc distentum compressi, arque exiade chylius
 “ omnis in pectoris cavitatem effluxit: quin et aqua per syphonem in ductum
 “ chyliferum inferius injecta, ultra quam canalisis iste disruptus est, penetrare non
 “ potuit, quin in thoracem pariter exiliit: claro argumento (uti videtur) cum ani-
 “ mal hoc ex chyli per vasa thoracica transitu impedito interit, per venas mesa-
 “ raicas non intrare, neque ullam aliam dari viam, quâ sanguini miscetur. Quin
 “ et hoc denique ante omnia confirmat, chylum, postquam ductus chyliferi ita
 “ perrupti sunt, in sanguinem per venas mesaraicas non transire; quia, si sanguis
 “ ab animali ita tractato ex arteriâ carotide aut vena jugulari adimatur, nihil ta-
 “ men chyli in illo apparebit, licet prius optimè passus fuerit; quod aliter omnino
 “ fieri debuit, nisi hoc modo fluxus ejus interciperetur, prout alibi ostendi.”

Mr. Hooke's description of an instrument contrived by Mr. TOWNLEY for di-
 viding a foot into many thousand parts, and thereby measuring the diameters of
 planets with great exactness, was read and ordered to be registered.”

“ Register, vol. iii. p. 227. It is printed in the Philos. Transact. vol. ii. n° 29, p. 541, for
 November 1667.

It was ordered, that one of the astronomical Instruments for dividing a foot into many thousand parts, as it was contrived by Mr. Hooke, should be made for Mr. HEVELIUS, at the charge of the society, and sent to him, as from them, by Mr. OLDENBURG.

Mention being made, that on the 20th of the present month of November there would be an horizontal eclipse of the moon, it was ordered, that Mr. BALLE and Mr. Hooke should make observations accordingly.

Mr. COLLINS having given an account, by word of mouth, of what was peculiar in the double horizontal dial formerly presented by him to the society, it was ordered, that this being sufficient for their information, his written account concerning it, together with the printed description of Mr. OUGHTRED's horizontal dial, should be put by Mr. Hooke's into the society's library.

Mr. COLLINS presented the society with a printed folio sheet of the reverse of the said dial, fit to be paited on a copper-plate, and to be varnished over, and so to serve as an engraven one with far less cost.

Occasion being given to speak of varnishes, Mr. OLDENBURG mentioned, that he had several receipts of them from Mr. COLLINS, which he would communicate.

November 16. At a meeting of the COUNCIL were present

The President

Mr. H. HOWARD of Norfolk
Mr. AERSKINE
Sir PAUL NEILE
Sir ANTHONY MORGAN
Dr. WILKINS

Dr. CLARKE
Mr. COLWALL
Mr. HOSKYNs
Dr. BALLE
Mr. OLDENBURG.

Mr. CHARLES HOWARD having been particularly desired to be present at this council to inform them of the state of Chelsea-college, he declared to them the necessity of some reparation of it, to prevent the falling of the roof. The council thereupon considered, that the grant of it not having yet passed the great seal, before which time they thought it not fit to be at expences about it, resolved, that such reparations should be deferred, till they had a legal possession of the house; and that for the same reason no constant indweller should be agreed with for the present.

Upon a motion made this day, it was agreed upon, that when the draught for subscribing contributions to carry on the work of the society should be brought in by Sir ANTHONY MORGAN and Mr. HOSKYNs, to whom it was formerly referred, it should then be offered promiscuously to able and willing persons, as well without as within the society.

It was voted, that there should be no preface to the bill to be subscribed for the purpose abovementioned; and that it should be a single obligatory bill to this purpose.

"I A. B. acknowledge to owe to the Royal Society the sum of ———
"to be paid, &c."

It being intimated, that the ground of the wardrobe was yet undisposed of, and that it was probable, that the King upon the motion of some of the council would not be unwilling to bestow it upon the society for the raising of a college upon it; the president was desired by the council to take an opportunity to break this matter to his Majesty; which his lordship promised to do.

It being moved, that it might be considered, whether the obligation subscribed by the fellows of the society, as it now is, hath not a legal validity, Sir ANTHONY MORGAN was desired to consider it accordingly, which he undertook to do; and the secretary was ordered to cause a copy to be made of the said obligation, and of the statutes relating thereto.

Dr. WILKINS being asked, whether he had spoken with Dr. LOWER about the curatorship, he informed the council, that he had, and found him very willing to serve the society to the best of his power; but that on account of some business, in which he was at present engaged, he could not immediately undertake that office.

Mention being made, that a security might be provided for such inventions or notions, as ingenious persons might have, and desired to secure from usurpation, or from being excluded from having a share in them, if they should be lighted on by others; it was thought good, if any thing of that nature should be brought in, and desired to be lodged with the society, that, if the authors were not of their body, they should be obliged to shew it first to the president, and that then it should be sealed up both by the small seal of the society, and by the seal of the proposer; but if they were of the society, then they should not be obliged to shew it first to the president, but only to declare to him the general heads of the matter, and then it should be sealed up, as mentioned before.

The business of the library of the society presented to them by Mr. HENRY HOWARD of Norfolk being discoursed of, and particularly the donor's desire to have it return to his family, in case of failure of the society; Mr. HOSKYNs moved, that those books, which remained unchanged, and those which were changed for others, be set down in two distinct catalogues; and that such catalogues being finished, whoever should have the custody of them and of the library for the society, be ordered to be delivered up to Mr. HOWARD or his assigns, in case the society be at any time dissolved.

Sir ANTHONY MORGAN moved, that Dr. AGLIONBY might be dispensed with for his admission-money and weekly payments; and the council complied so far
with

with his motion, as that the admission-money should be remitted him altogether, and the weekly payments for one year after his admission.

N^o 29 of the *Philosophical Transactions*, was licensed.

It was mentioned, that it had been desired by the society at their last meeting, that the council would consider of the entering of the letters, which concerned the society, into their letter-book; viz. that all such letters, as were written by the society, or by any member of the society, upon a philosophical account, and the answers to them, read before the society (except those, that shall be excepted upon being read) are to be filed up, or put into a book, and thence to be transcribed into a letter-book appointed for that purpose. This was referred to another meeting of the council.

The committee made the following report to the council concerning the treasurer's accounts.

" *At a committee of the council of the Royal Society for auditing the treasurer's accounts*
" November 11, 1667,

" Upon examination of Mr. COLWALL's accounts we find him Debtor

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" To the arrears due to the society for their quarterly payments to " this 11th day of November, 1667	992	18	6
" To money he hath received for admissions	23	10	6
" To the balance of his last account (in money) ending 5 Nov. " 1666	73	2	4
	1089	11	4

" We also find him Creditor

" By money he hath paid for the use of the society, as by bills and
" order

" By arrears of such persons, as have been omitted by order of
" council dated Octob. 29, 1666, viz.

	<i>l.</i>	<i>s.</i>	
" Lord LUCAS	9	2	
" Sir JOHN DENHAM	14	15	
" Dr. SCARBURGH	11	18	
" Mr. DRYDEN	9	19	
" Mr. VERMUYDEN	11	15	
" Mr. SCHROTER	9	15	
	67	4	0

" By

" By arrears owing by several members deceased, viz.

	<i>l.</i>	<i>s.</i>	
" Mr. RICHARD BOYLE	—	7	7
" Sir KENELME DIGBY	—	5	17
" Dr. HOARE	—	11	11
" Lord MASSARENE	—	14	9
" Dr. QUATREMAIN	—	3	18

l. s. d.
43 2 0

" By arrears owing by the rest of the fellows yet unpaid — 697 18 9

" By balance resting in cash now in his hands, seventy-seven pounds
" fifteen shillings and five pence, besides one hundred pounds in
" the chest } 77 15 5

1089 11 4

" BROUNCKER, P. R. S.
" JOHN WILKINS
" PETER BALLE
" JOHN HOSKYNs."

Nov. 21. At a meeting of the SOCIETY,

Monsr. LEYONBERG, resident from the King of Sweden, proposed by Sir THEODORE DE VAUX, was elected and admitted.

Mr. SOAME was elected and admitted.

Count CHARLES UBALDINI of Monte-Feltri proposed by Mr. OLDENBURG was elected.

Sir CHARLES BERKLEY and Mr. OUDART were elected.

The statute giving notice of the approaching day of the anniversary election was read: as also the statute for nominating and balloting a committee of the society to audit the accounts of the treasurer. The vice-president in the president's absence nominated Dr. LOWER, Dr. KING, Mr. WRAY, Mr. HOOKE, and Mr. COLLINS for auditors; and they being put singly to the ballot were chosen, and appointed for their meeting the Thursday following at Arundel-house before the meeting of the society.

Dr. LOWER having acquainted the society, that one ARTHUR COGA⁷ was willing to

⁷ Mr. OLDENBURG in a letter to Mr. BOYLE, dated at London Nov. 25, 1667, and printed in Mr. BOYLE's works, vol. v. p. 374, 375, observes,

that this Mr. COGA was looked upon as a *very fresh and extravagant man*; that he had studied at Cambridge, and was said to be a batchelor of divinity;

to suffer the experiment of transfusion to be tried upon himself for a guinea, it was resolved, that the offer should be accepted, and the physicians of the society be desired to be present at the operation to be performed on the Saturday following, the 23d instant about ten or eleven of the clock in the morning, at Arundel-house; and that Dr. LOWER and Dr. KING particularly should be desired to manage the experiment; who were desired accordingly, and undertook the operation.

Dr. POPE produced a piece of the rock called the soapy rock in Cornwall, which feels like soap, but does not dissolve in water. Several of the members supposed it to be talk. The doctor intimating, that he had formerly given a piece of it to Mr. BOYLE to examine it, it was ordered, that Mr. BOYLE should be desired to inform the society of what he had observed in it.

Dr. POPE having likewise informed the society, that he had agreed with a friend of his in Cornwall to preserve for their repository whatever fishes and birds were to be met with in these parts; he was desired to see what fishes and birds of that country there were already in the repository, and to acquaint his friend therewith, desiring him at the same time to furnish the society with as many of those, that were wanting, as he could.

Several anatomical experiments formerly ordered to be tried, not being ready, the trial of them was appointed for the next meeting; as 1. That of making the blood in a dog circulate between an artery and a vein on the same side, to see, how it would alter the circulation in the rest of the body; or what would become of the dog, if the blood could so quickly pass to the heart. 2. That of making the blood pass from one side of a dog to the other, without passing through the lungs.

The experiment of tying up both the external jugulars of a dog was again appointed to be made by Dr. LOWER on the Tuesday following upon an old dog, and an account of the success to be laid before the next meeting.

Mr. BALLE and Mr. HOOKE being called upon for their observations of the horizontal eclipse of the day before, they said, that they could not observe any thing, the weather not being favourable.

Nov. 28. Count UBALDINI and Sir CHARLES BERKLEY were admitted.

JAMES DU MOINLON, M.D. was proposed candidate by the lord BERKLEY, and

WILLIAM LE HUNT, esq; was proposed candidate by Dr. WILKINS.

divinity; and that he was an *indigent person*. And Dr. KING in a letter to Mr. BOYLE, dated the same day from Boswell court, London, (*ibid.* p. 638.) remarks, that Mr. COCA was about thirty-

two years of age; that he spoke Latin well, when he was in company, which he liked; but that his brain was sometimes a little too warm.

Mr.

Mr. COGA, the first person in England, on whom the experiment of transfusion was made on the 23d instant, by order of the society, and by the management of Dr. LOWER and Dr. KING*, according to the method brought in by the latter, Octob. 24, 1667, and entered in the register-book, presented himself before the society, and produced a Latin paper of his own, giving an account of what he had observed in himself since he underwent the said experiment: which was ordered to be filed up, and Dr. LOWER and Dr. KING were desired to give in their accounts of the experiment.

It was ordered likewise, that Mr. COGA being willing to have the experiment repeated on him, it should be tried again accordingly, when the physicians of the society should judge it seasonable.

Mr. HOOKS being called upon for an account of the experiment which he undertook to try in private, of passing the blood of a dog from one side to the other without its passing through the lungs, said, that he had attempted it, but that it did not succeed so well as he wished; but that he thought he had now devised a method of making it succeed as he desired, of which he hoped to give the society a good account at the next meeting.

Mr. OLDENBURG acquainted the society, that he had received some new experiments about light and air from Mr. BOYLE to be communicated to them; which were read, and ordered to be registered†.

It was ordered, that these experiments (which were several phenomena of rotten shining wood inclosed in a receiver of the rarefying-engine, and having the air ex-

* Mr. OLDENBURG in his letter to Mr. BOYLE of the 25th of November, cited in the preceding note, takes notice, that this experiment was performed at Arundel-house in the presence of many spectators, among whom were Mr. HENRY HOWARD and both his sons, the bishop of SALISBURY, four or five physicians, some parliament-men, &c. and that Dr. KING performed the chief part of it with great dexterity, and so much ease to the patient, that he made not the least complaint, nor so much as any grimace, during the whole time of the operation: that he found himself very well upon it, his pulse and appetite being better than before; his sleep good, his body as soluble as usual, it being observed, that the same day he had three or four stools, as he used to have before. On the morning of the date of Mr. OLDENBURG's letter, the lord viscount BROUNCKER, who on account of very pressing business could not be present at the operation, and Mr. OLDENBURG went to see Mr. COGA pretty early, and found him in bed, very well, as he assured them, and more composed, as his host affirmed, than before. Dr.

KING likewise in his letter written the same day, and cited above, remarks, that after the operation the patient was well and merry, and drank a glass or two of Canary, and took a pipe of tobacco in the presence of forty or more persons; then went home, and continued well all day, having three or four stools, as he used to have, his pulse being stronger and fuller than before, and he very sober and quiet, more than before, as the people of the house said, who thought, that he had only been let blood. In the night he slept well, but sweat two or three hours, and next day was very well, and so remained, and was very willing to have the experiment repeated, his arm being, he said, well. A person asking him, why he had not the blood of some other creature instead of that of a sheep transfused into him, he answered, *Sanguis est symbolitum quandam facultatem habet cum sanguine Christi, quia Christus est agnus Dei.*

† Register, vol. iii. p. 239. They are printed in the Philos. Transact. n° 31. p. 581. for Jan. 1667.

hausted) should be prosecuted at the next meeting, by providing such wood, and putting it into a close vessel; as also by placing some in the compressing-engine.

Mr. CHARLES HOWARD presented for the repository an earth smelling very sweet like tragoriganum, taken up near London.

Mr. BALLE presented likewise for the repository a piece of rotten maple-wood having many maggots, covered with theca's and leaves, within the heart of it.

Dr. SMITH took from hence occasion to mention, that at Ancona there is a kind of shell-fish found in great clay-stones. The stones, as also the number and growth of the fish, are discerned by certain little holes, which increase proportionably with them; yet are never big enough for the fish (especially the shell) to get out. When the stones are taken out of the water, the fish will often thrust their heads to the mouth of the holes, and then suddenly retiring into them again squirt the water near a foot high, like so many *jets d'eau*. They are in substance and taste like oysters, and being bruised shine in the dark like rotten wood. They are there commonly called *ballari del mare* from their figure.

Mr. SKIPPON confirmed this relation by assuring the society, that such like fishes were also bred in rocks upon the coast of Languedoc; and that this was mentioned by RONDELETIUS.

Dr. POPE farther confirmed this account, and remarked, that the like were found in Cornwall on the sea-shore.

The president produced a letter written to him from Bristol by one Mr. METREDONE SPEED, dated Nov. 20, 1667^b, giving an account of an artificial Spa-water made of steel, esteemed as medicinal as the natural, together with some extracts of St. Vincent's water, commended as highly efficacious in curing several stubborn diseases. This letter being read, it was ordered, that the powder sent with it should be divided, and the one half sent to Mr. BOYLE at Oxford, and the other half delivered to Dr. WILLIS now in London^c, (both by the care of Mr. OLDENBURG) to examine these substances, and to give the society their thoughts of it.

Mr. OLDENBURG produced a letter written to him by RENATUS FRANCISCUS SLUSIUS, canon of Liege, dated there 24 Novemb. 1667, N. S.^d giving an account of his method of reducing an equation of the fourth degree or biquadratic into two quadratic equations, by a circle and a parabola; and expressing his great respect to the society. It was ordered, that the secretary should return him the thanks of the society^e, and that Mr. HOOKE and Mr. COLLINS should have a

^b Letter Book, vol. ii. p. 84.

^c He had removed from Oxford and settled in St. Martin's-lane, Westminster, after the fire of London in 1666.

^d Letter Book, vol. ii. p. 95. See Mr. BOYLE's

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works, vol. v. p. 3^{re}.

^e Mr. OLDENBURG's letter to Mr. SLUSIUS was dated 25 Nov. 1667. Letter Book, vol. ii. p. 102.

copy of the letter to consider, whether Mr. SLUSIUS had effected what he had undertaken.

Mr. OLDENBURG communicated another letter, written from Oxford by Dr. WALLIS, and dated Novemb. 16, 1667¹, containing a rule of his to find the number of the Julian period for any year assigned; the cycle of the sun and that of the moon, and the Roman indiction being given. It was ordered, that the doctor should be desired to send his demonstration, and to consider, whether this rule could not be made more easy and less operose.

Mr. COLLINS declared, with what ease this had been performed by Father DE BILLY the Jesuit in a letter dated at Dijon, the 22d of Aug. 1666, and printed in the *Journal des Sçavans*². Mr. OLDENBURG having that journal by him, that part of it, which concerned this particular was read, and approved of; whereupon Mr. COLLINS undertook to give the demonstration of this rule not yet published by the French, and to bring it in at the next meeting.

Nov. 30. Mr. OUDART was admitted.

Dr. WILLIS presented his book, intituled, *Patbologiæ cerebri et nervosi generis specimen, in quo agitur de morbis convulsivis et scorbuto*³.

The lord bishop of SALISBURY acquainted the society with a present made them by Dr. COTTON of a good quantity of load-stones digged up in Cornwall.

A report was brought in of the accounts of the treasurer for the last year to the satisfaction of the society, as follows:

" *At a committee for auditing the accounts of DANIEL COLWALL, esq; treasurer to the Royal Society, November 28, 1667,*

" It appears, that Mr. COLWALL is Debtor

		<i>l.</i>	<i>s.</i>	<i>d.</i>
" To the arrears due to the society for their quarterly payments		992	18	6
" from 5 Nov. 1666, to 11 Nov. 1667				
" To money he received for admissions		23	10	6
" To balance of his last account		73	2	4
		1089	11	4

" Of which it appeareth he hath received

¹ Letter-Book, vol. ii, p. 98.

² Printed at Oxford 1667, in 4to.

³ N° 36. Sept. 6, 1666. p. 699. edit. Amsterd. 1679.

" Upon

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" Upon the quarterly payments ——— ———	184	14	6
" More for admissions ——— ———	23	10	6
" And the balance of his last account ——— ———	73	2	4
	<u>281</u>	<u>7</u>	<u>4</u>
" It also appeareth, that he hath paid			
" Particular bills by order to the use of the society amounting to	203	11	11
" And that he hath resting in cash in his hands ———	77	15	5
	<u>281</u>	<u>7</u>	<u>4</u>

" Examined and approved by

" RICHARD LOWER
 " EDMUND KING
 " JOHN COLLINS
 " ROBERT HOOKE."

This being the anniversary day for electing the council and officers of the Royal Society for the year ensuing, this election was performed according to the rules prescribed by the charter and statutes, there being this day present fifty-nine fellows.

The eleven, who were elected to be continued of the COUNCIL, were

The lord viscount Brouncker	Sir ANTHONY MORGAN
The lord bishop of SALISBURY	Dr. WILKINS
HENRY HOWARD of Norfolk	Mr. COLWALL
Mr. AERSKINE	Mr. HOSKYNs
Sir ROBERT MORAY	Mr. OLDENBURG,
Sir PAUL NEILE	

The ten new members of the COUNCIL were

The lord ASHLEY	Sir GEORGE ENT
The lord BRERETON	Sir PHILIP CARTERET
Mr. CHARLES HOWARD	Mr. THOMAS NEILE
Mr. BOYLE	Mr. HAYES
Sir JOHN LOWTHER	Mr. CREED,

The officers chosen were

The lord viscount Brouncker, president.

Mr. Colwall, treasurer.

Dr. Wilkins, }
Mr. Oldenburg, } secretaries.

The new members of the Council sworn,

The lord Brereton
Mr. Charles Howard
Sir George Ent

Sir Philip Carteret
Mr. Creed.

The other five were absent.

Between this and the former anniversary election died one of the first members of the society, ABRAHAM COWLEY, who was born in the year 1618¹, in Fleet-Street near the end of Chancery-lane². His father, who was a grocer, dying before his birth, his mother by the interest of her friends procured him at a proper age to be admitted one of the King's scholars in Westminster-school. The occasion of his first inclination to poetry was his casual lighting on SPENSER's *Fairy-Queen*, when he began to read, and take some pleasure in it; and he had read that great poet all over before he was twelve years old³. And his love of learning appeared so early in him, that while he was very young, he used, instead of playing with his school-fellows on holy-days, to steal from them, and walk into the fields, either alone with a book, or with some one companion, if he could find any of the same temper. He was at the same time so much an enemy to all constraint, that his masters could never prevail on him by any persuasions or encouragements, to learn without book the common rules of grammar⁴, in which they dispensed with him alone, because they found, that he performed the usual exercise out of his own reading and observation. Before he left Westminster-school he published at London in 1633 in 4to his *Practical Blossoms*, when he was only in his sixteenth year. Being sent to the university of Cambridge, he was elected scholar of Trinity-college there in 1636; and two years after were printed at London in 8vo his *Love's Riddle, a pastoral comedy*, written while he was at Westminster-school, and his Latin comedy, intitled *Naufragium jocularis*, acted in Trinity-college Feb. 2, 1638. The first occasion of his being engaged in public business was his elegy on the death of Mr. WILLIAM HARVEY⁵, who died at Cambridge Sept. 23, 1647. This brought

¹ Dr. SPRAT's life of Mr. COWLEY, prefixed to Mr. COWLEY's works, edit. 1679 fol.

² Wood Foli. Oxon. vol. ii col. 120.

³ COWLEY's Essays, essay vi.

⁴ Ibid. But Dr. SPRAT imputes it to the de-

fect of Mr. COWLEY's memory, that his teachers could never bring it to retain the ordinary rules of grammar.

⁵ Second son of Sir WILLIAM HARVEY of St. Edmondsbury in Suffolke, by Susan, daughter of Sir

brought him acquainted with Mr. JOHN HARVEY, brother of his deceased friend, and afterwards treasurer to Queen CATHARINE, consort to King CHARLES II. and by this gentleman's recommendation he was introduced into the service of the lord JERMYN, afterwards earl of St. Albans *. In the beginning of 1643, he being master of arts was, among many others, ejected from his college and university, on account of his attachment to King CHARLES I. upon which he retired to Oxford, settled in St. John's college there †, and under the name of a scholar of Oxford published the same year in 4to a *satyr, the Puritan and Papist*. Here he prosecuted his studies with the same success as before; nor was wanting to his duty in the war itself, being present and in service in several of the King's journeys and expeditions, by which means, and the reputation of his genius, he soon grew familiar with the chief men of the court and the gown, whom the fortune of the war had drawn together, and particularly the lord viscount FALKLAND ‡. He left Oxford a short time before the surrender of it to the parliament in June 1646, and went to Paris §, where he attended on Queen HENRIETTA, wife of King CHARLES I. and spent ten years of his absence from his native country in bearing a share in the distresses of the royal family, or in labouring their affairs, by maintaining the constant correspondence between the King and Queen, and by performing several dangerous journeys into Jersey, Scotland, Flanders, Holland, or wherever else the service of CHARLES II. required his attendance. In the year 1656 ¶ he returned to England, and while he lay hid in London was seized, examined and confined, but at last obtained his liberty upon Dr. SCARBURG's giving a thousand pounds bail for him *. Complying afterwards with some of the men then in power he procured an order for creating him doctor of physic in the university of Oxford Decemb. 2, 1657; on which account †, and on that of a passage in the preface to one of his books written while he was a prisoner, he incurred the suspicion and ill-will of the royal party. However upon the confusions, that followed the death of OLIVER CROMWELL, he went back into France, and remained in the same station as before, till near the time of the King's restoration ‡. Upon that event not meeting with the preferment, which he expected, and being disappointed of the mastership of the Savoy, promised him by both the Kings CHARLES I. and II. § or from a disinclination to public life, he determined on a private one in the country, where he spent his last seven or eight years, having obtained a plentiful estate by the favour of the earl of St. ALBANS and the bounty of the duke of BUCKINGHAM *. This was a lease of a farm held of the Queen dowager at Chertsey in Surrey †, where he appears to have settled in the spring of the year 1665 ‡. At the first meetings of the Royal Society before its establishment he was named

Sir ROBERT JERMYN, of Rushtbrooke in that county, grandfather of Sir HENRY JERMYN, earl of St. Albans.

* SPRAT and WOOD, *ubi supra*.

† Wood, *ubi supra*.

‡ SPRAT, *ubi supra*.

§ Wood, col. 120.

¶ Dr. SPRAT is mistaken in saying *twelve*.

* Wood, col. 120.

* Dr. SPRAT, *ubi supra*.

† Wood, col. 120.

‡ Dr. SPRAT.

§ Wood, col. 120. See Mr. COWLEY's 11th Essay, intitled *Of myself*.

* Dr. SPRAT.

† Wood, col. 120.

‡ See a letter of his to Dr. SPRAT dated at Chertsey

named as a proper person for the design of it⁴; and on the 13th of February 1667⁵ was proposed as a candidate, and on the 6th of March elected a member. About June 1661 he published in 8vo his *Proposition for the advancement of experimental philosophy, dedicated to the honourable society of Gresham-college*. But his residence in the country preventing him from attending the meetings of the society, he was not rechosen into it after the passing of the second charter of April 22, 1663. He died at a house called the Porch-house, towards the west end of the town of Chertsey, July 28, 1667, in the 49th year of his age, and was interred on the 3d of Aug. in Westminster-Abbey, where in May 1675 a monument was erected to him by the duke of BUCKINGHAM, the epitaph on which was written by Dr. SPRAT⁶, who has done justice to his memory in the account and character of him prefixed to his works.

Another member, whose name being printed in the list of the society in 1666, and omitted in that of 1667 shews, that he must have died in that interval, was WILLIAM QUATREMAINE, M. D. who was educated at Pembroke college, in the university of Oxford, where he took the degree of doctor of physic June 23, 1657⁷, and about the beginning of the year following was sent for in the name of King CHARLES II. then in Flanders to be his physician, being recommended by the marquis of ORMONDE to Sir EDWARD HYDE in very strong terms⁸, having been very useful to the marquis in managing his return to France after a secret journey made by his lordship into England in January 1657⁹ for the sake of his Majesty's interests. These few circumstances to Dr. QUATREMAINE are the only ones known to me, except that he was honoured with the friendship of Sir EDWARD NICHOLAS, secretary of state, as appears from several of his letters to Sir EDWARD extant among the papers of the latter. He had been proposed candidate for election into the society January 23, 1667, and being chosen March 20, was admitted and subscribed his name June 26, 1661.

Dec. 5. Dr. DU MOLIN was elected and admitted.

JOHN DOWNS, M. D. was proposed candidate by Dr. CROUNE.

Dr. KING brought in his written account of the transfusion of sheep's blood into a vein of Mr. COGA, which was ordered to be registered¹⁰.

There were produced two great pieces of the sweet earth, mentioned at the meeting of Nov. 28. dug up at Hoxton. Dr. CROUNE having infused some spirit of wine upon some of the earth, the spirit was found to have received both a strong taste and smell from the earth, but no tincture.

Chertsey May 2, 1655, printed by Mr. FRANCIS PECK in his *Collection of historical pieces*, p. 81. at the end of his memoirs of OLIVER CROMWELL, edit. 1740 in 4to.

⁴ See vol. i. p. 4.

⁵ Wood, col. 120, 121.

⁷ Wood Fasti, Oxon. vol. ii. col. 116.

⁸ Letter of the marquis of ORMONDE to Sir EDWARD HYDE, in CARTER's collection of original letters, vol. ii. p. 123. edit. London 1739, in 8vo.

⁹ Register, vol. iii. p. 233. It is printed in the Philosoph. Transact. vol. ii. n.º 30. p. 557. for Decemb. 1667.

Some of the members were of opinion, that if the place, where this earth was found, were searched, there would probably be found some spring of petroleum.

It was ordered, that the operator should carry one of the pieces in the name of the Society to Monfr. LE FEBURE, to examine it by distillation; and that Dr. CLARKE should be desired to confer with Monfr. LE FEBURE, about the best way of distilling it.

Mr. OLDENBURG communicated a letter written to him by Mr. RICHARD NORWOOD from the Bermudas islands, dated June 18, 1667¹, giving an account of several particulars propoed to him by Mr. OLDENBURG in a letter of October 24, 1666², concerning the course of the tides there, wells both salt and sweet dug near the sea, the whale-fishing there practised anew, and the sperma ceti whales.

Mr. OLDENBURG produced likewise a great packet of letters and other papers sent to him by Mr. HEVELIUS from Dantzick and several other places on the Baltic, that from Mr. HEVELIUS being dated November 15, 1666, N. S.³ These letters and papers contained divers answers to queries formerly sent thither concerning fucinum, the effects of cold, the method of making pot-ashes, the observables about sal gemmæ, &c. To which were added several relations of other particulars communicated by some learned men at Dantzick and other places adjacent, of their own accord, concerning trials made of injecting liquors into human veins, an odd birth of twins, and a suggestion of new materials for telescopical glasses, &c.⁴

Of these papers only that on the trials of injection⁵ was read at this meeting, and the rest referred to the next.

In the mean time it being taken into consideration, how the letters, which belonged to the Society, might be well preserved, it was resolved, that the Council should be desired to take care, that all letters, which are written by and to the Society, or by and to any of their members, be put up together in a book, and thence tran-

¹ Letter-Book, vol. ii. p. 37. It is printed in the Philos. Transact. n° 30. p. 565.

² Letter-Book, vol. i. p. 35.

³ Letter-Book, vol. ii. p. 58.

⁴ Ibid. p. 58.—84. Mr. MICHAEL BERM's letter to Mr. HEVELIUS, concerning some chemical, medicinal and anatomical particulars, is printed in the Philos. Transact. n° 34 p. 650.

⁵ This paper, which does not appear in the register-books, contained, according to Mr. OLDENBURG in a letter to Mr. BOYLE of December 10, 1667. (Mr. BOYLE's works, vol. v. p. 375.) an account of three persons, upon whom injection into the veins had been tried, of whom two received great benefit, but the third died, though through his own neglect. Upon hearing this ac-

count read, a certain physician then present, a learned and ingenious man, "was to my great grief," says Mr. OLDENBURG, so precipitate, as to say, "That he would engage, that that one, viz. who the ill success, was the only true, but the other two both false. I could not but take him afterwards aside, and represent to him, how he would resent it, if he should communicate upon his own knowledge an unusual experiment to the curious at Dantzick, and they in public brand it with the mark of falsehood: that such expressions in so public a place and in so mixed an assembly would certainly prove very destructive to all philosophical commerce, if the curious abroad should be once informed, how their symbols were received at the Royal Society."

scribed

scribed into the Letter-book appointed by statute for that purpose; except such letters, or such particulars in them, as shall be ordered by the society not to be entered.

Mr. OLDENBURG brought in the sequel of Mr. BOYLE's experiments about light, several of which were read, and the rest referred to the next meeting.

Mr. HOOKE was put in mind of preparing for the experiments of this kind to be made as soon as might be, according to the particulars appointed at the meeting of November 28.

Mr. AUBREY produced a new method, communicated to him by Mr. FRANCIS POTTER, of measuring time by an air-strainer; which Mr. HOOKE was desired to consider, and to give his thoughts of it at the next meeting.

Mr. WYLDE mentioned, that he knew of a way of measuring time like that produced by Mr. AUBREY; and that he had it from Mr. SMETHWICK, who acknowledged to have received it from Sir EDWARD LAKE*, chancellor of Lincoln.

It was thought desirable to have the description of these instruments delivered in writing.

It was ordered, that the experiment of transfusion be made at the next meeting, and that Dr. LOWER and Dr. KING be desired to manage it, as they did before; and that the operator do not fail to prepare things necessary for that purpose, especially good scales to weigh the emittent animal in both before and after the operation.

December 9. At a meeting of the COUNCIL were present

The lord bishop of SALISBURY
The lord BRERETON
Mr. H. HOWARD of Norfolk
Mr. AERSKINE
Sir ANTHONY MORGAN
Sir GEORGE ENT

Sir PHILIP CARTERET
Dr. WILKINS
Mr. HOSKYNs
Mr. CREED
Mr. OLDENBURG.

The business of Chelsea-college being considered of, upon debate it was resolved,

1. That Mr. COLE should have one hundred pounds, to secure the possession of the land and house at Chelsea-college to the society, during so much of the term of the lease of forty years granted to Mr. HOWARD, as was yet un-expired.

* He was created a baronet after the Restoration, according to Mr. WOOD, Athen. Oxon. vol. ii. p. 323.

2. That

2. That this agreement be executed before the passing of the seal for the reversion.

3. That Mr. COLE's covenant and bond be taken for security.

These votes being passed, Sir PAUL NEILE and Sir ANTHONY MORGAN were desired to go to Mr. COLE, who was without, attending this business, and to acquaint him with these resolutions; which they did accordingly, and reported, that he was satisfied with them.

Sir ANTHONY MORGAN and Mr. HOSKYNs reported concerning the legal validity of the obligation subscribed by the fellows of the society, that the statutes had already specified the penalty for non-observance, viz. expulsion; and that thereby other penalties were precluded.

N^o 30. Of the *Philosophical Transactions* was licensed.

December 12. At a meeting of the SOCIETY,

Dr. DOWNS was elected and admitted.

The second experiment of transfusion was made by Dr. KING upon Mr. ARTHUR COGA, by taking from him eight ounces of blood, and transmitting into him, by gulls, about fourteen ounces of sheep's blood. Dr. KING was desired to bring in an account of it to be registered. This experiment being made in a great crowd of spectators, which would not admit of that exactness, which was designed, the physicians of the society were requested to take an opportunity of making this experiment more exactly by weighing the emittent animal before and after transfusion.

The rest of Mr. BOYLE's experiments about light were read, with great satisfaction to the society; who ordered, that all should be registered, and that Mr. HOOKE should take care of having the like experiments tried before the society, as soon as he could procure any shining rotten wood or fish.

Mr. DANIEL COXE brought in an account of the sweet earth lately dug up at Hoxton, which was ordered to be registered^p.

Mr. AERSKINE acquainted the society, that Monfr. LE FEBURE having received from them some of this sweet earth, in order to examine it by distillation, had told him, that he hoped to give an account of it at their next meeting.

Dr. WILLIS in a letter to Mr. OLDENBURG, dated Decemb. 12th, sent (as he had been desired to do) his thoughts of a powder for making artificial Spa-water; as also some extracts of St. VINCENT's water sent to the president by Mr. SPEED; in

^p Register, vol. iii. p. 235.

^q Letter-Book, vol. ii. p. 84.

which paper he observed, that the powder was either vitriolum Martis at best, or, as he rather thought, only common English copperas dried and powdered: and that with regard to the extracts, each of them being a feveral calx of mineral water evaporated, there was no use of them, nor any thing worth inquiry to be insisted on about any of them. But the doctor referring the society to what he should make out when he should come himself, the consideration of this particular was deferred till that time.

Mr. HOOKE being called upon for giving an account of what he thought of the method of measuring time, brought in at the last meeting by Mr. AUBREY and Mr. WYLDE, said, that though the inventions were ingenious, and, as he thought, new; yet that by reason of the inequality of the air, caused by the various degrees of its rarefaction and condensation, as also of its driness and moisture, it would not be fit for pocket-watches, nor of that exactness and use, that pendulums were.

Mr. WYLDE produced his instrument for measuring time, which, according to his and Mr. SMETHWICK's relation, was due to Sir EDWARD LAKE. It was a cylinder with air, described by Mr. SMETHWICK; which description he was desired to bring in writing at the next meeting, to be registered.

Mr. AUBREY was also desired to give an account in writing of the measure of time produced by him, being a watch to go with a pair of bellows, instead of wheels; which he promised to do.

Dr. CROUNE mentioned, that some such inventions were taken notice of by the jesuit SCHOTTUS in his *Technica curiosa*; which book he was desired to peruse, and to extract out of it for the use of the society what he should meet with there of this kind worth observation; which he undertook to do.

Mr. OLDENBURG produced more of the papers lately sent by Mr. HEVELIUS, and read some of those, which contained relations concerning amber, pot-ashes, and sal gemmæ. It was ordered, that those, which answered the inquiries about cold, formerly sent to Dantzick, should be read at the next meeting.

He brought in an algebraical problem sent to him from Paris, as proposed by Monfr. DE LAURENS, which was ordered to be communicated for solution to Mr. COLLINS.

Mr. HOOKE and Mr. COLLINS were put in mind of giving an account of Monfr. SLUSIUS's theorem, committed to them on the 28th of November, in order to be examined by them.

Mr. COLLINS communicated his demonstration of the numbers for finding the Julian period, the reading of which was deferred till another meeting.

Mr.

Mr. Hooke was called upon for the experiment of circulating the blood of an animal out of the veins into the arteries through an open vessel, without passing through the lungs. He said, that he would prepare it as soon as he could.

Dr. Lower was put in mind of the experiment of tying up the external jugulars in an old dog, in order to make his head swell and become transparent, so that it would kill him in two days.

December 19. EDWARD BROWN, M. D. was proposed candidate by Dr. CROUNE.

Mr. COGA being introduced gave an account of the effects of the experiment of transfusion repeated upon him, viz. that he found himself very well at present, though he had been at first somewhat feverish upon it; which was imputed to his excess in drinking too much wine soon after the operation. An account thereof in writing was desired to be brought in by the managers of that second experiment.

For the prosecution of experiments of that kind, Dr. CROUNE was desired to speak with Dr. TERNE, physician to one of the hospitals in London, that he would try the experiment, as he had opportunity, upon such patients there, as he and others of the physicians of the society should think proper subjects for it.

Dr. WILLIS suggested, that this experiment might be proper to make use of upon rotten sheep.

Mr. POVEY communicated his account of the way of laying on colours by means of eggs mixed with any part of a fig-tree beaten therein; which was ordered to be registered^a, as follows:

“ Amidst the many remarkable varieties, which are observable in the art of painting, there is one, which hath been delivered over to us by the ancients, which hath in it a secret of great assistance in the art of painting, and which carries in it a mystery worthy the inquisition of a philosopher.

“ Before the art of painting had advanced to the more late invented practice of mingling the colours in oil, we find, that there was, among many others, a certain sort of distemper, (for so we now distinguish other liquid colourings from that of oil) which I know not by what chance, or felicity, or revelation, was discovered and made practicable, it seeming at first overtured to be an extravagant composition, not at all probable or rationally proper to what was designed, and what it doth familiarly produce.

“ The painter takes three or four eggs (the fresher the better) breaks them into a porringer, or some such little vessel (sometimes separating the white, and

^a Register, vol. iii. p. 259.

“ using that alone) and afterwards puts into them one or two small pieces of a
 “ green fig, or of the branches of that tree, of about an inch in length or less,
 “ or the leaf itself, which being infused a few minutes, the juice or milk thereof
 “ so prevails upon the egg, which in its own disposition is viscous and rosy, that
 “ it becomes instantly thin and fluid, as water; and although the yolk and white
 “ be confounded together, yet themselves impart so little tincture, that the painter
 “ useth it as he doth oil, without any further addition or improvement, and laying
 “ it upon his pallet, and mingling all sorts of colours with it, (even the purest
 “ white) he works and finisheth his piece.

“ The experiment being by accident discoursed by me with some persons of this
 “ society, was received with such incredulity, that, for my own vindication, I
 “ tempted several of the society, with the president, to see the operation at Mr.
 “ STREETER'S, (a general and excellent master of the pencil) where Sir ROBERT
 “ MORAY broke eggs into two little vessels, and did then put two small pieces
 “ of the fig-tree into one vessel only, and presently saw the verity of what is before
 “ described: And having seen Mr. STREETER mingle colours with it, and lay
 “ them, they went afterwards to my house, where they saw a chimney-piece wrought
 “ thus by DANKARTS in landscape, who having studied long in Italy, had seen
 “ many things, which had been done this way, especially a large cabinet in the
 “ pope's palace.

“ And since, by your appointment, I have looked somewhat curiously into the
 “ secret of this converted matter of egg by the infusion or touch of the fig or
 “ fig-tree (whose milky juice is found by naturalists to be so corrosive by the
 “ powerful salt lodged therein, and so apt to dissolve all viscous matter, that it is
 “ said to be one of the principal ingredients in the making of one sort of mithri-
 “ date) I may pardonably observe further to you, that it is generally agreed, that
 “ this sort of oil or distemper (for with leave it may be said to be both, and nei-
 “ ther, if we should particularly describe the differences and the agreements, which
 “ are to be found in it; is probably as ancient as the emperors, though not so or-
 “ dinarily used and familiarly understood in this latter age; and there are extant
 “ some pieces finished this way by CORREGGIO, which, I have heard persons of the
 “ highest judgment in painting say, are most valuable for their delicacy in work,
 “ and beauty in colouring, and satisfaction in all things, that should be perfect
 “ in the most masterly piece of painting; and that they were held not to be over-
 “ priced at one thousand pounds each; they being indeed worthy of the utmost
 “ price, that can be set upon painting, or the highest efforts of art; and were
 “ considered as jewels, in the rich collection his late Majesty had of the best
 “ paintings.

“ I here also further observed, that this oil of egg (if I may so call it) is so
 “ much of the nature of distemper, that when the piece is set against the light, it
 “ troubles not the sight by glazing or glaring, which hinders us from looking
 “ directly upon pictures in oil, if they be set directly opposite to the light; and
 “ we find the painter hath more command on this mixture, because it permits
 “ him to neglect it, and take off his hand from his work, and return to it at
 “ pleasure,

“ pleasure, by reason that its drying quality renders the begun picture ready for him at all times : So that he is at liberty to work it over as often as he pleaseth, until by his repeated touches he hath brought his piece to the utmost, that time and his own art can reach to ; it being demonstrably true, that labour, study, and often working over pictures with this sort of mixture by a skillful hand infinitely improves the work, and makes the colouring approach very near to that which is laid in oil : yet is this so much of the more tender nature of ordinary distemper, that it is not to be exposed to weather ; but is also in some considerations much above other sorts of distemper, in that every accidental dash of water, or other slight injury, will not hurt it ; but being with easy care preserved, it lasts almost for ever in its first freshness (if the substance, upon which it is laid, be durable) and will continue its colouring much better than oil : some colours being apt to languish in oil, which will keep alive in distemper.

“ This narrative being sufficient to discharge those commands given me by this society, I would have leave to add my advice, that a further inquiry be made into this, and all other sorts and ways of painting in oil, distemper, or dry colourings ; because it may not perhaps be unworthy of your knowledge, to find the differences, which arise from the several uses of colours, and the mediums, by which they are applicable ; and it seems not unlikely, that something yet new and undiscovered may spring up to further improvement, which ought to be, and is the most honourable part of that you aim at ; that you may not seem to entertain yourselves with curiosity and speculation only, but may by that various and universal learning, which meets here, as it were in council, leave something new or improved to the succeeding world ; and still go on to inflame this age, by a generous emulation abroad, to envy and imitate what you have more happily first opened and essayed : that it may not be said by the malicious, that you discourse and make flourish, and subsist chiefly upon what is delivered to you by them, that lived before you.

“ Nor is the generous subject of painting unworthy of some part of your care and research, which hath been the study, delight and ornament of all ages and nations, where peace or civility have not been abandoned ; which hath hitherto been described and discoursed of only in parts and fragments, by several persons in differing languages, and yet deserves an entire history, to be conducted by such an influence as yours, out of those various authors and traditions of the ancients, and the more modern experience : by which rendezvous of the best intelligence and information, we may deposit and find in one volume a sufficient history of all the parts relating to this almost divine art, which not only imitates but approacheth very deceivably, even to the giving life itself.

“ By such a history, warily and faithfully extracted out of what is or hath been materially observed and collected, and now to be written in one stile and order, we may easily and pleasingly inform ourselves of the first lines and footsteps of this art ; the names and characters of the most eminent mailers ; their manner and several ways of working ; the degrees of improvement of this art ; the variety of their colours, their natures and mixtures ; sometimes drawn out of minerals,

"nerals, leaves of trees and flowers, and several juices and berries, and many other accidental ways of obtaining and applying of colours.

"But this desired volume, and all that it shall offer, as authentic, must have its first and last authority, spirit and confirmation from you, as well as the conjunction of some select persons of your number, who may have meetings with the chief masters of these times, whom I have found with joy and candid openness ready to assist a work so apparently tending to the honour and advantage of their profession, and their own personal fame, who may deferre to be registered therein as eminent masters. It is acknowledged by all, that no proper genius hath been engaged on this general work; for what hath been writ by painters, doth shew that their pen hath not been so good as their pencil: And what hath been undertaken by men contemplative only, hath not given full satisfaction; because perhaps they have disdained to consult sufficiently with painters, or to submit their own imagination and conceit of things to the judgment and experience of those, whom practice hath made more competently and aptly learned, and more adequate to the work of assisting, and informing, towards the making compleat and perfect such a history, as is here wished and proposed.

"And although painting be as the chief and sovereign, yet there are many lesser arts, proper and worthy to attend and be of the train, and to appear as an appendix in the same volume; which are, the several sorts of vernice; browning; staining; graving; etching, and perhaps some other necessary curiosities not foreign to this greater subject: All which being collected from the several persons of ingenuity, who have particularly studied, practised and experimented them, may be re-examined and attested by you, and become no inconsiderable adherents to this entire history of the arts of painting; which being thus accompanied and finished, will surely be received and welcomed into the world, as a thing most useful and desirable."

Mr. POVEY renewed his former suggestion, that some members of the society would meet together, and consider of the particulars to be inquired into concerning the curiosities in the art of painting, and then confer about it with some of the best masters of that art living in London, as Mr. LELY, Mr. COOPER, and Mr. STREETER, they having already declared their willingness to serve the society in what they could in this matter.

It was ordered hereupon, that Mr. POVEY, Sir PHILIP CARTERET, Sir THEODORE DE VAUX, Mr. EVELYN, Mr. HENSHAW, Dr. CROUNE, Mr. HOSKYNs, Mr. WYLDE, and Mr. HOOKE should be desired to meet accordingly for that purpose.

Mr. POVEY produced a letter of Mr. ALEXANDER MARSHAL to himself, dated at Castle-Ashby November 30, 1667, concerning colours, which was read, and an extract of it ordered to be made and preserved, as follows:

Letter-Book, vol. ii. p. 93.

From

" Castle-Ashby Nov. 30, 1667.

" S I R,

" I Had answered yours, had it come to my hands sooner. I am very willing
 " to satisfy in part your desire concerning my colours, but how to express the
 " handling of them I know not; for practice puts me in a new way every day.
 " One colour may set out the other by composition or transparence, which
 " leaves the beauty, as the flower or other things require. I thought seven years
 " ago, that I knew much, but I find, that practice shews me daily more than I
 " knew before; but the last week I tried one colour, and calcined it in three feve-
 " ral pots, and in one fire together: the pots being cold, I found in them three
 " several colours, which was but one at first; the one was red, the other yellow,
 " and the other amber, and all very good for use. As for the colours I make
 " out of flowers, or berries, or gums, or roots, they are more subtle, and have
 " not so great a body, as minerals, which I turn into lakes, or dry them in shells,
 " which I temper with such waters, as I make fit for them and my use. The
 " search of colours has cost me much time in finding out, and to know, which
 " would hold colour in water, and mix well; else I had not used them in my
 " book; and, am sure, will be as fresh a hundred years hence, as when you saw
 " them last. The truth is, they are pretty secrets, but known, they are nothing.
 " Several have been at me to know, how; as if they were but trifles, and not
 " worth secrecy. To part with them as yet I desire to be excused. I have in a
 " manner given over water-colours, finding it tedious and forcible to the eyes,
 " which has put me upon the practice in oil, and I am in good hopes, that my
 " colours will shew themselves as beautiful in oil as water; though many will say,
 " that it is needless for oil-colours to be so orient or beautiful in painting. In my
 " opinion 'tis a great prejudice to painters also, to paint carelessly with any colours,
 " that will starve, and become nothing, by a salt, that is in them. Certainly
 " BRUEGELH and ELSHMER, and other masters, had a way in cleansing and
 " curing their colours, which as yet is to be seen in their small curious works as
 " fresh as ever they were; for salt and oil cannot agree long, and so were parted
 " by those masters, that their fame might last as well for their colours as work.
 " Sir, I beg your pardon, not knowing whether my abrupt discourse does an-
 " swer your desire; and so I rest,

" S I R,

" Your humble and most

" obliged Servant,

" ALEX. MARSHAL."

Monfr. LE FEDURE brought in two liquors drawn from the sweet earth dug up
 at Hoxton: one was a phlegm well scented; the second an oil resembling petro-
 leum. Both these being drawn from one pound of that earth, there remained, as
 Monfr.

Monsr. LE FEBVRE observed, fifteen ounces and a half of sediment or *caput mortuum*. He was desired to give in the account of the whole process in writing, which he promised to do.

Dr. MERRET produced a paper, wherein first he mentioned, that three skulls with the hair on and brains in them were lately found in Black-friars in pewter vessels in the midst of a thick stone-wall, with certain obscure inscriptions: secondly, he gave an account from one Mr. LOVELL of a very rich lead ore in Wales: thirdly, his thoughts of the four mineral powders or salts sent by Mr. SPEED from Bristol to the president: fourthly, some experiments of the *finectis* or soap-stone, found on the sea-side in the west of England. This paper was ordered to be registered¹, and the author desired to inquire more particularly after the three skulls, and to endeavour to get one of the pots, wherein they were found.

Dr. CLARKE confirmed that part of this paper, which mentioned the lead ore in Wales, and promised to bring in a relation concerning it from Dr. WALDRON.

Mr. HOOKE communicated an account of an experiment tried by him in the presence of Dr. LOWER upon a mastiff-bitch big with puppies, to see, whether *foetus's* live in the womb by their own or the mother's respiration. It was ordered to be registered², and was as follows:

“ In prosecution of the former inquiry about respiration, to know whether
 “ the life of the *foetus* in the womb were continued without its own respiration,
 “ by means of the ventilation of the blood of the dam by its respiration; upon
 “ Wednesday the 18th of Dec. 1667, Dr. POPE and myself tried the following
 “ experiment. We took a large mastiff-bitch, that had gone about seven weeks
 “ with puppy, and binding her down on a table, we opened the right side of the
 “ belly about the middle, between the spine and the middle muscle of the
 “ belly, and through that perforation taking out one of the horns of the uterus,
 “ and opening it, we took out one of the whelps, that was large and lusty, and
 “ seemed to be almost ready to be whelped. Then before he had taken in any
 “ breath, we opened the throat, and disclosed the *aspera arteria*, and running a
 “ needle and thread suddenly under it, we tied it so fast, that nothing of air could
 “ pass in or out by it; then wrapping up the *foetus* in warm linnen cloaths, we
 “ laid it by the fire, but it survived but some few minutes, and then died. Then
 “ we took out another, and, instead of taking it out of its inclosed skins, as we
 “ had done the former, we made a gentle ligature about the neck upon the
 “ amnion, including the head of the whelp, as it were in a bladder, of its own
 “ natural liquor, so as neither air, or any other liquor, but the liquor of the
 “ amnion could come to the mouth. Then we suffered it to lie in water warmed
 “ to about the same heat with the natural heat of the womb of the bitch; but
 “ neither did this long survive; but we took notice, that the whelp within a minute
 “ or thereabouts, after he had been separated from the dam, began to gape and
 “ strain as it were to take in breath, and after a little while died. We tried
 “ likewise a third, by keeping his head and mouth all the while till we

¹ It does not appear in the Register.

² Register, vol. iii. p. 265.

“ had, according to the former method, tied up his *aspera arteria*; then keeping him
 “ warm in cotton wool warmed and laid by the fire-side we found him moveless
 “ within some few minutes. A fourth we tried by suffering it to lie in its own
 “ bags and liquors without making any ligature at all, either by a band about its
 “ neck, or by a tying about the *aspera arteria*: this also we found as subject to
 “ fate as the rest, for he seemed to be dead as soon as any of the rest, though it
 “ was expected, that it would have lived a very long time. So that upon all
 “ these observations we found, that none of them would survive ten minutes of
 “ time measured by a pendulum-watch.

“ These experiments seem to hint, that the *fœtus* in the womb has its blood
 “ ventilated by the help of the dam; and that it is not the want of the motion
 “ of the blood through the lungs, or the imaginary stopping of it there, that
 “ kills the *fœtus*; since we have no reason to believe, that the *foramen ovale* was
 “ shut in these whelps, before they had taken in any air into their lungs. Nor
 “ can we imagine any other cause of the so sudden death of them, save only the
 “ want of the ventilation of the blood, or whatever other operation respiration
 “ may be proved to work on the blood: and methinks also it may seem very
 “ manifestly to prove the continual and necessary communication of the blood of
 “ the dam with that of the *fœtus*, and of the immediate dependance of the one
 “ upon the other.

“ One thing by the way we took notice of, which was not to be passed by,
 “ and that was, that in one of the cells of the womb we found a *fœtus* dead,
 “ which seemed to have lain so in that place for above a month; which we guess’d
 “ by its bigness, that was very small in comparison of the other, which we had
 “ taken out alive; which seemed to shew a very great providence of nature, for
 “ the keeping of that dead *fœtus* in the womb without at all prejudicing of it,
 “ until the time of the birth of all the rest.”

Mr. OLDENBURG mentioned, that an offer was made to him by Monsr. AUGUSTINI BOUTENS, a curious person at Antwerp, in a letter dated December 3, 1667*, to transmit a considerable quantity of the *ludus Helmontii*, with an intire description of its medicinal virtues; as also of its situation in the ground, &c. and that he would send for a hundred pounds weight or more of it, if any members of the society would make experiments with it. He was desired to send for a good quantity, as there would be no want of persons to take it off.

Dr. CROUNE produced an instrument for gathering and contracting wind, otherwise imperceptible, so as to extend a tender sail. The operator was ordered to make another model, that might go as tenderly as possible, against the next meeting.

Mr. OLDENBURG acquainted the society, that he had received an account printed in French of the spots lately discovered in MARS by Signior CASSINI in Italy, pro-

* Supplement to the Letter-Books, vol. ii. p. 78.

bably inferring the revolution of that planet about its axis. The English translation of this account by Mr. OLDENBURG was read, and ordered to be registered.

Dec. 26. The society did not meet.

January 2, 1667. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
HENRY HOWARD of Norfolk
Sir PAUL NEILE
Sir JOHN LOWTHER
Dr. WILKINS

Mr. HAYES
Mr. HOSKYNs
Mr. CREED
Mr. OLDENBURG.

Sir JOHN LOWTHER and Mr. HAYES were sworn as members of the council.

It was ordered, that the president, the bishop of SALISBURY, Sir PAUL NEILE, and Dr. WILKINS be desired to speak on the Monday following with the commissioners of the treasury about Chelsea-college, and to meet for that purpose at Sir PAUL NEILE's lodgings.

Mr. PANTON appearing before the council, and expressing his desire for their assistance in promoting his design to establish a royal academy for educating of young gentlemen in good manners, languages, arts and sciences, and generous exercises; the council upon deliberation returned this answer, that though they well approved of this design, and were very desirous to promote it, each for himself; yet as they were a body, it was not their practice to intermeddle with any business, but such as either arose from among themselves, or came to them by way of reference.

The business of voluntary contributions for building a college being moved again, it was upon debate thought good,

That those, who had a mind to contribute, should not be obliged to subscribe their respective sums till the total of the subscriptions amounted to one thousand pounds: and that those of the council, who had most interest to engage others both of the society, and without it, should be desired to employ the same in speaking to persons of both sorts, and to learn the sums of their intended contributions, thereby to make an estimate what the total was likely to amount to.

At a meeting of the SOCIETY on the same day,

Dr. BROWN was elected and admitted.

The earl of CONWAY being proposed by Sir ANTHONY MORGAN was immediately elected.

Sir

Sir MAURICE EUSTACE was proposed candidate by Sir ANTHONY MOROAN.

CHARLES HOTHAM, esq; was proposed candidate by Mr. HENRY SLINGSBY.

Dr. CROUNE reported, that Dr. TERNE was willing, at the desire of the society, to try the experiment of transfusion upon morbid persons, as he should see opportunity, in the hospital, to which he was physician.

The meeting of the committee of the society with some of the painters in London being again spoken of, it was ordered, that Mr. POVEY should be desired to take care of putting that meeting into a method, by which it might be made effectual for the purpose intended: as also, that Sir PHILIP CARTERET, Mr. HOSKYNs, and Mr. WYLDER should be added to that committee.

Dr. CROUNE acquainted the society, that Mr. TOWNLEY presented the society with his astronomical box for dividing a foot into many thousand parts; and that he expressed his desire to try the experiment of transfusion, if he might be furnished with the necessary apparatus for it. It was ordered hereupon, that such silver pipes, as had been used by the society in this experiment, should be forthwith bespoken, and when made, sent to him: and Dr. KING was desired to take care of having the said pipes made, which he undertook to do.

Dr. CROUNE likewise mentioned, that he had understood of Mr. TOWNLEY, that he was now employed in turning of optic-glasses by a lathe, and hoped shortly to send one of them to the society.

Mr. HOOKE produced a piece of clock-work, said to serve always to promote a pendulum strait, without any check at all. It not being yet complete, it was ordered to be produced again at the next meeting with the addition of what was necessary to perfect it.

He was put in mind of his new cyder-engine, and ordered to get a model of it made, as soon as conveniently he could.

He produced a paper giving an account of a way devised by him of discovering the various pressures of the air at sea, to predict the alteration of weather, and to foresee storms. It was ordered to be registered; and Mr. HOOKE was desired to get such a weather-glass made, as was described in this paper, as soon as he could.

He was put in mind of making the experiments with shining wood and fish, both in the exhausting engine and in a close glass, with the same air always remaining: of circulating blood in an open pipe, without its passing through the lungs: of the experiments in the rarefying-box, and that in the Park, when the weather should serve; and of swelling the head of an old dog by tying up the external jugulars.

† Register, vol. iii. p. 278. It is printed in Mr. BOYLE's works, vol. v. p. 379.

H h 2

Dr.

Dr. CROUNE was put in mind to take care of having his wind-gathering vessel made ready by the operator against the next meeting, if possible.

Some more of the papers sent by Mr. HEVELIUS from Dantzick were read, containing answers to inquiries concerning cold, amber, &c. formerly sent thither. These papers being large, Dr. CLARKE and Dr. CROUNE were desired to meet Mr. OLDENBURG at his house, to peruse and consider of them, and to report to the society; which they promised to do, appointing to meet together on the Tuesday following at two of the clock at the place above-mentioned.

Mr. HOOKE produced a Latin letter sent him from a Bohemian with a little book in the German tongue. The letter was ordered to be read at the next meeting, and the book to be delivered to Mr. OLDENBURG, that he might peruse it, and give an account of it at the next meeting.

Sir THEODORE DE VAUX produced a letter to himself from Mr. JOSEPH WALSH; dated Decemb. 29, 1667*, giving an account of several earths or clays, found in Worcestershire, good for scouring of cloth, and for fetching grease out of silk; intimating also, that there were half a dozen sorts of clays in his ground. Sir THEODORE was desired to send for samples of those clays to be examined; which he promised to do.

January 9. Sir MAURICE EUSTACE was elected.

Mr. CHARLES HOTHAM was elected and admitted.

Dr. KING brought in the silver pipes ordered to be made for Mr. TOWNLEY to make experiments of transfusion therewith; and the operator was ordered to deliver them to Dr. CROUNE, who had moved the society for them on Mr. TOWNLEY's behalf.

Dr. KING communicated his written account of the experiment of transfusion, as it was the second time made on Mr. COCA; which was ordered to be registered†.

Dr. CLARKE made a report concerning the papers sent from Dantzick to Mr. OLDENBURG, viz. that the answers to the queries, which had been sent thither, and the account of the monstrous twin-birth, seemed to him fit to be registered: and there being two letters from Monsr. BEHM, consul of Dantzick, containing several good remarks both physical and anatomical, he desired a copy of them, in order to consider of some return to be made thereto, as he had already done to that of Dr. FABRICIUS concerning the injection of liquors into veins. With respect to the manuscript about amber, that being written in the German tongue, it was desirable, that a translation of it into English might be made by those members, who understood that language.

* Letter-Book, vol. ii. p. 115.

† Register, vol. iii. p. 280.

It was ordered hereupon, that those answers, and that paper concerning the twin-birth should be registered accordingly^b; and that a copy should be made for Dr. CLARKE of those letters named by him: and that Mr. HAAK and Mr. OLDENBURG should be desired to translate the manuscript about amber at their convenience; the latter promising to do his part, Mr. HAAK being absent.

Mr. OLDENBURG intimated, that Monfr. AUZOUT, having read Mr. SPRAT's *History of the Royal Society*, and found mentioned in it, among other things, a new kind of level, had in a letter dated at Paris Decemb. 29, 1667, N.S.^c desired a communication of it. Mr. HOOKE was accordingly desired to make a draught of it to be sent to Monfr. AUZOUT.

The experiments appointed for the next and following meetings were

1. The weather-glass for measuring the pressure of the air at sea.
2. Dr. CROUNE's wind-gathering vessel.
3. A model of a cyder-pressing instrument.
4. The tying up the jugular veins of an old dog.
5. Experiments with shining fish.
6. Circulation of the blood without passing through the lungs.
7. The perfecting of the new clock-work for always promoting a pendulum-strait, without any checking of it.

It was ordered likewise, that Mr. HOOKE should bring in a description of his new astronomical instrument, answering to that of Mr. TOWNLEY for dividing a foot into many thousand parts, and thereby observing with great exactness the distances of the parts; and that the copy of it should be sent to Mr. HEVELIUS.

Jan. 11. At a meeting of the COUNCIL were present

The President

HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Mr. AERSKINE
Sir JOHN LOWTHER
Sir GEORGE ENT
Sir PHILIP CARTERET

Dr. WILKINS
Mr. HAYES
Mr. COLWALL
Mr. CREED
Mr. OLDENBURG.

It was ordered, that the president, the bishop of SALISBURY, Mr. HENRY HOWARD, Sir PAUL NEILE, Dr. WILKINS, and as many more of the council,

^b Letter-Book, vol. ii. p. 60. & *seqq.*

^c *Ibid.* p. 117.

as could conveniently, should meet on the Monday following about ten in the morning at Whitehall at the lodgings of the lord almoner to her Majesty, to attend the lords commissioners of the treasury concerning Chelsea-college, to bring that business to an issue.

Mr. Hooke was desired to bring in at the next meeting of the council a draught for the building of the society's college.

The list of the fellows of the society being read over, and the persons, who were thought both willing and able to contribute to the said building, taken notice of, it was thought fit, that a committee should be chosen to solicit those persons: and there were named

The President

The bishop of SALISBURY
HENRY HOWARD of Norfolk
MR. BOYLE
Sir ROBERT MORAY
Sir JOHN LOWTHER

Dr. WILKINS
Mr. EVELYN
Mr. HENSHAW
Mr. HOSKYNES
Mr. OLDENBURG.

The president was desired to solicit

The earl of DEVONSHIRE
Sir ANTHONY MORGAN
Sir CYRIL WYCHE
Mr. SLINGESBY

Capt. COCK
Mr. PEPYS
Mr. AUSTEN.

The bishop of SALISBURY was desired to solicit

The archbishops of CANTER-
BURY and YORK
The duke of ALBEMARLE
The lord ROBERTES

The earl of LINDSEY
The bishops of LONDON and
WINCHESTER.

HENRY HOWARD of Norfolk to solicit

The marquess of DORCHESTER
The earl of NORTHAMPTON
The earl of DEVONSHIRE

The earl of CARLISLE
Sir THEODORE DE VAUX
Mr. POVEY.

Sir ROBERT MORAY to solicit

The earl of ARGYL
The earl of CRAWFORD and
LINDSAY

The earl of KINCAIDIN
The earl of TWEEDALE
The lord STERDMONT.

Dr. WILKINS to solicit

The

The duke of BUCKINGHAM
The earls of DEVONSHIRE and
CARLISLE
Sir WILLIAM PETTY
Dr. COTTON
Mr. MATTHEW WREN

Mr. WILLUGHBY
Mr. HENSHAW
Mr. WYLDE
Dr. WILLIS
Dr. WHISTLER
Dr. SMITH.

Mr. BOYLE to solicit

The lord CLIFFORD

Mr. RICHARD JONES.

Sir JOHN LOWTHER to solicit Sir EDWARD BYSSHE.

Mr. EVELYN to solicit Mr. PACKER.

Mr. HENSHAW to solicit Sir ROBERT PASTON.

Mr. HOSKYNs to solicit Mr. THOMAS NEEL.

Mr. OLDENBURG to solicit

The lord ANNESLEY
Sir JAMES SHARN

Sir ROBERT SOUTHWELL
Mr. RICHARD JONES. ⁴

N^o 31 of the *Philosophical Transactions*, was ordered to be printed.

A letter from Col. BLOUNT to the president was read, desiring his discharge from being any longer a fellow of the society.

Jan. 16. At a meeting of the SOCIETY,

Mr. HOOKE produced the two weather-glasses, one open, the other close, for observing the various pressures of the air at sea, in order to predict alterations of weather. He was ordered to see another made very accurately, to be recommended to some careful seamen to carry it to sea, and to make observations therewith.

⁴ Mr. OLDENBURG in his letter to Mr. BOYLE, then at Oxford, dated January 14, 1667, and printed in Mr. BOYLE's works, vol. v. p. 380, 381, giving an account of these proceedings of the council of the society, mentions, that Mr. HENRY HOWARD intended to continue his generosity to it, either by contributing a good sum of money, or giving ground about Arundel-house to build upon. "They guess," adds he, there will "be four classes of contributions: some of an "100l. some of 60 or 50, some of 40, some of

"20. Our president hath already declared for "100; and I think the bishop of SALISBURY "for the like sum: Dr. WILKINS for 50, Mr. "HAYES for 40, Sir PHILIP CARTERET for 50, "and, if there be occasion, for more. We begin "with the council, and proceed to the society, "that when we go on to beg of others not of "our body, they may not object we would load "others, and draw our own necks out of the "yoke."

He produced a model of his new cyder-engine with the addition of a contrivance for cutting the apples. He was desired to consider of this, and to endeavour to add it to this contrivance.

The lord BRETON took occasion from hence to mention, that all sorts of dried fruit, as raisins, figs, plums, prunes, &c. fermented with common water, would yield as much and better liquor than the same fruit being fresh. His lordship was desired to give in writing the particulars of the way of practising this; which he promised to do, when some of his domesticks, who had been employed therein, should come to London. In the mean time he remarked, that six pounds of raisins, with a gallon of water, duly fermented, would yield a liquor as strong as sack, and keep good a twelvemonth.

Mr. HOOKE produced likewise his new contrivance of promoting the vibrations of pendulums, so as to prevent all checks, which he affirmed to have been provided against by no invention hitherto. He was desired by the lord BERKLEY to take care of having such a one made for him, and by the society to bring in, as soon as he could, the descriptions and schemes of this instrument, as well as the other two produced before, viz. that of the sea-weather-glasses, and the cyder-engine.

Dr. CROUNE mentioned, that Mr. TOWNLEY had intimated to him his desire of having engraven upon the astronomical instrument lately presented by him to the society, for dividing a foot into many thousand parts, &c. some words, that might preserve the memory of that donation, viz. *RICHARDUS TOWNLEY dono dedit regie societati die 2 Januarii anni 1667*. Upon which Mr. HOOKE was ordered to see this desire of Mr. TOWNLEY executed.

Mr. OLDENBURG communicated a letter written to him by Mr. SAMUEL COLEPRESSED, and dated at Plymouth 7 January, 1667, giving an answer to the printed queries concerning the course of tides, and an account of the state of that country and the several sorts of it, especially that most proper for covering of houses; with several experiments made by himself upon them. This letter was ordered to be entered^a; and Mr. OLDENBURG was desired to write to Mr. COLEPRESSED to send some samples of three different sorts of slate, in order that the society might make the like trials with them.

Mr. OLDENBURG produced an account written to him by THOMAS ALLEN, M. D. dated January 16, 1667, containing an accurate description of an hermaphrodite then in London; which was read, and ordered to be registered^b.

^a That part of it relating to slate is entered in the Letter-Book, vol. ii. p. 138, and printed in the Philos. Transact. vol. iv. n° 50, p. 1009, and the other containing the observations on the tides in the Register, vol. iii. p. 287, and printed in

the Philos. Transact. n° 33, p. 632.

^b Register, vol. iii. p. 281. It is printed in the Philos. Transact. n° 32, p. 624, for February 1667.

Mr.

Mr. OLDENBURG mentioned likewise, that he had received advice from Paris, that the person formerly said to have undertaken the translation of the *History of the Royal Society* into French, had not yet begun it, and was willing to forbear, upon notice sent him, that there was one in London, who would perform it. And Dr. DE MOLIN being the person, who had undertaken that work in England, and now present, was desired by the society to proceed in what he had begun with all possible care and diligence; which he promised to do.

The experiments appointed for the next meeting were,

1. Dr. CROUNE's wind-gathering vessel.
2. Shining fish and wood to be tried both in the rarefying and compressing engine.
3. Some horse-eyes for discovering the cause of blindness in horses.
4. Tying up the external jugulars in an old dog.
5. Circulating the blood, without its passing through the lungs.

January 23. THOMAS ALLEN, M. D. was proposed candidate by Mr. OLDENBURG.

The operator was ordered to hasten the making of a thermometer for the use of the Queen.

Dr. POPE presented for the repository a large roundish bone, supposed to be one of the vertebrae of a whale.

Mr. OLDENBURG produced a box, sent him from Mr. SAMUEL COLEPRESSE, for the repository, containing sixty four sorts of minerals, each sort having annexed to it a description of its kind and mixture; among which there was one piece of iron-ore, mixed with another substance, which was sensible of a magnet's approaching it.

Sir THEODORE DE VAUX produced a white soapy clay sent him out of Worcesterhire, with two letters, promising to send more of that clay, together with some other, written by Mr. JOSEPH WALSH, and dated Decemb. 29, 1667, and January 12, 1667¹.

The lord BERKLEY acquainted the society, that some ships being ready to sail for the East-Indies, if the society had any queries to send thither, he would recommend them. Upon which it was ordered, that the queries formerly drawn up for that purpose, and such others, as Dr. POPE and Mr. HOOKE should add,

¹ Letter Book, vol. ii. p. 115 and 128.

should be immediately got ready and delivered to the lord BERKLEY for his recommendation.

Dr. LOWER opened some horse's eyes, to shew the cause of the frequent blindness in horses proceeding from a spongy excrescence, that grows out of the uvea of the eye of that animal. He was desired to bring in a description of this observation to be registered; which he promised to do at the next meeting.

Mr. HOOKE made an experiment to discover, whether a piece of steel first counterpoised in exact scales, and then touched by a vigorous magnet, acquires thereby any sensible increase of weight. The event was, that it did not.

He proposed an experiment to discover, whether any substance could be made heavier than gold. It was ordered, that the trial should be made before the society the next day.

He was ordered to take care, that the experiments concerning shining wood and fish be made at the next meeting, both in the compressing and rarefying engine.

He was desired to bring in the description both of his new engine for grinding, and pressing of cyder-fruit, and of his clock-work for promoting the vibration of a pendulum stait, without any check; as also of his instrument for dividing a foot into thousands of parts, for making exact astronomical observations.

January 25. At a meeting of the COUNCIL were present

The lord bishop of SALISBURY
Mr. HENRY HOWARD
Sir ANTHONY MORGAN
Sir GEORGE ENT

Dr. WILKINS
Mr. HOSKYNs
Mr. OLDENBURG.

There was prepared (there not being a quorum sufficient to make it effectual) an order for issuing twenty-five pounds towards the expences requisite for passing the patent concerning his Majesty's grant of Chelsea-college.

There was likewise prepared an order for providing a convenient room for Dr. LOWER to make anatomical experiments in for the society.

The letter formerly ordered to be drawn up by Mr. OLDENBURG for Sir ROBERT MORAY about soliciting contributions in Scotland, was read; and it was thought fit, that something should be added, expressing Mr. HOWARD's bounty in giving the ground to build the college upon.

The business of contributions being again spoken of, Mr. OLDENBURG mentioned, that the earl of ANGLESEA had declared his willingness to enable his son to contribute; as also his own inclination to be of the society, and further the work
of

of building. Mr. OLDENBURG added, that Mr. BOYLE had expressed his readiness to do his part.

Mr. HOWARD gave some account of his solicitations for contributions, viz. that Sir SAMUEL TUKE was ready, not only to pay his arrears, but also to contribute to the building according to his abilities; and that he thought the earl of Devonshire and Mr. POVEY would do their part.

Dr. WILKINS mentioned, that Mr. NELTHORP and Mr. SKIPPON would also contribute.

January 30, the SOCIETY did not meet on account of the solemn fast; but the COUNCIL did, there being present

The President

HENRY HOWARD of Norfolk

Mr. AERSKINE

Sir PAUL NEILE

Sir JOHN LOWTHER

Dr. WILKINS

Mr. THOMAS NEILE

Mr. HAYES

Mr. COLWALL

Mr. CREED

Mr. HUSKYNES

Mr. OLDENBURG.

Mr. THOMAS NEILE was sworn of the council.

It was ordered, that the treasurer issue twenty five pounds towards the expences requisite to pass the patent concerning his Majesty's grant of Chelsea-college, and deliver it to Mr. JEPHSON for that use, on account:

That Sir ANTHONY MORGAN be desired by the secretary, to take care, that Mr. COLE give no interruption to the passing of the patent above-mentioned:

That the operator hire a small room near Arundel-house, on the water-side, convenient for Dr. LOWER to make anatomical experiments in for the use of the society: And

That Sir ANTHONY MORGAN be desired by the secretary to attend Mr. HOWARD, to consider with him of the best way of securing to the society his conveyance of the ground in Arundel-house for building a college upon, so as to make it valid in law by collateral security, or otherwise, if need be.

The form for subscribing contributions to build a college for the society was agreed upon, as follows:

" I ——— give unto the president, council, and fellows of the Royal Society of London for improving natural knowledge, towards the building of an house or college for them upon the ground near Arundel-house, given for that use by the honourable HENRY HOWARD of Norfolk, the sum of ———

" and do hereby engage myself to pay the said ——— within one year from
 " the date hereof, upon the usual feasts of Lady-day, Midsummer, Michaelmas,
 " and Christmas, by even and equal portions. In witness whereof I have here-
 " unto set my hand and seal this ——— day of ———.

" Sealed and delivered in the presence of ———."

Two hundred copies of this form were ordered to be forthwith printed, but so, that in one hundred of them should be left a blank after the words *feasts of* unto the words *by even*, it being considered, that some subscriptions were likely to be made after Lady-day should be past.

The president subscribed one hundred pounds towards the said college: And

Mr. JAMES HAYES, forty pounds.

These two subscriptions were left with Mr. OLDENBURG.

The letter intended to be written by the council to Sir ROBERT MORAY, and drawn up by Mr. OLDENBURG, was read again, with the addition ordered at the last meeting of the council; and the said letter was approved of and signed by the president in the name of the council, with this superscription, *For the Right Honourable Sir ROBERT MORAY, knt. one of his Majesty's commissioners for the treasury of Scotland in Edinburgh.*

The letter was as follows *:

London, at a meeting of the council of the Royal Society, Jan. 30, 1667.

" S I R,

" **T**HE council of the Royal Society having lately taken into serious con-
 " sideration, what might be the most probable means to establish the society
 " and its design of improving useful knowledge to perpetuity; and having found
 " upon mature deliberation, that one of the ways most likely to effect the same
 " may be the erecting of a college fit to meet, and to make their observations and
 " experiments in; they have accordingly resolved to endeavour to engage as many
 " of the members of the Royal Society, and of others also not of their body, as
 " are willing and able to promote so noble and useful a work: In pursuance of
 " which, they have already begun to solicit divers of the society, and found no ill
 " success in this undertaking; in which they are more especially encouraged by
 " the signal nobleness and bounty of the honourable HENRY HOWARD of Norfolk,
 " most generously bestowing on the society a piece of ground in Arundel-house,
 " sufficient to build such a college on; the raising of which they intend, God
 " willing, to begin with this approaching spring; and if the design be seconded
 " by cheerful contributions, hope to finish by Michaelmas next.

* Letter Book, vol. ii. p. 132.

“ And being persuaded, that those of the nobility of Scotland, whose names are here enrolled in the list of the society, are with many others satisfied of the usefulness of this institution, and of the necessity of making such an establishment as this, they thought fit to give you, of whose zeal for its prosperity they are well assured, notice of this their intention, that so you may be invited, as you have opportunity, to insinuate this undertaking to those of your noble countrymen, as are of the society, and to bespeak the concurrence of their generosity in contributing with all convenient speed, what they may, to further so good an establishment: Which being effectually done, as it cannot but redound to the immortal fame of the contributors, so it will certainly add to the reputation you have already so much gained and deserved of this society,

“ Brouncker, R. S. P.”

February 6. At a meeting of the Society,

WILLIAM, earl of Strafford, was proposed candidate by the earl of DEVONSHIRE, and immediately elected and admitted.

Dr. ALLEN was elected.

Dr. LOWER brought in his written account of the cause of the frequent blindness of horses, which was read, and ordered to be registered^a.

Dr. CROUNE produced his wind-gathering vessel, which was examined and thereupon ordered to be improved, according to the suggestions of Mr. Hooke, and to be brought in again thus improved at the next meeting:

SIR THEODORE DE VAUX communicated a letter from Mr. JOSEPH WALSH, dated Jan. 20, 1667, giving an account of some useful clays found in Worcestershire, and sent by him for the society's repository; which letter was read, and ordered to be registered^b.

Mr. Hooke produced a letter written from Balfora, near the Persian gulf, by Mr. HENRY POWELL January 6, 1667, giving an account of a new star and dreadful earthquakes in those parts, which letter being read, was ordered to be entered in the Letter-Book^c.

Notice being given, that a vessel was ready to sail for the Bermudas, it was ordered, that what was designed to be sent thither for Mr. NORWOOD, in answer to his letter of the 17th of June 1667, should be recommended to the captain of that vessel, Mr. THOMAS MORLEY, which Mr. OLDENBURG undertook to do^d.

^a Register, vol. iii. p. 284. It is printed in the *Philos. Transact.* n^o 32, p. 613.

^b Letter-Book, vol. ii. p. 129.

^c P. 136. It is printed in Mr. Hooke's *Philosophical experiments and observations*, p. 29.

^d Mr. OLDENBURG's letter to Mr. NORWOOD, dated Feb. 10, 1667, thanking him for his communications, and recommending other particulars to his care, is entered in the Letter-Book, vol. ii. p. 147.

Mr..

Mr. CHARLES HOWARD moved, that some particulars relating to the plants of the Bermudas might be in the same letter for Mr. NORWOOD; and he was desired to specify those particulars^a, and to deliver them to Mr. OLDENBURG.

Mr. OLDENBURG produced NICHOLAS STENO's new book intituled, *Musculi Descriptio Geometrica*, printed at Florence 1667, in 4to, which was delivered to Dr. CROUNE to peruse it, and to give an account of it to the society.

Mr. OLDENBURG communicated and read a printed letter sent to him by the author JOHN DENIS, M. D. professor of philosophy and mathematics at Paris, relating to a late cure of an inveterate phrensy by the transfusion of blood^b.

The experiments appointed for the next meeting were,

1. To try whether gold can be made heavier than itself, by making quicksilver penetrate into the pores of it.
2. To cut away the tympanum of a dog's ear, to see the consequences of it, as to the animal's hearing.
3. To compress air upon shining fish.

February 13. Dr. ALLEN was admitted.

Mr. LE HUNT was admitted.

Mr. FLOWER was proposed candidate by Mr. OUDART.

ESSAY WARD, M. A. was proposed candidate by Dr. WILKINS.

Mr. HOOKE gave some account of the experiment, which had been proposed by him to be tried, of making a body heavier than gold, by putting quicksilver to it, to see, whether any of it would penetrate into the pores of gold. He related, that he had tried it, and found, by weighing the gold in water before and after the addition of mercury, that it had acquired somewhat a greater ponderosity; but that he did not rely on that experiment, and would therefore try it again more exactly.

It was moved, that this experiment might be extended farther, viz. to try what metalline bodies penetrate into one another, in order thereby to make compound bodies to be heavier than the compounding parts are, weighed when asunder: This trial to be made with lead and mercury, with tin and copper.

The experiment of cutting the tympanum of a dog's ear was tried, but without success. It was ordered to be tried again in private, and then to be repeated

^a Mr. HOWARD's paper is entered in the Letter-Book, p. 149.

^b An extract of it is printed in the Philosoph. Transact. n^o 32, p. 617.

before the society; the member, who proposed it, being desired to take farther care of it.

Dr. CROUNE produced again his vessel for rendering wind discernible, when it is not discerned by any sense without it.

Mr. HOOKER exhibited another such vessel of another contrivance.

It was ordered, that they should be both tried and compared, and an account of the effect given to the next meeting.

Dr. CROUNE gave an account of Mr. STENO's *Musculi Descriptio Geometrica*, that the author pretended only to compose an essay on that subject, and reckoned up the desiderata in the doctrine of muscles; adding several good experiments, among which was one of tying up the artery descending from the head, and thereby depriving the animal immediately of all motion: Which experiment was ordered to be tried before the society at the next meeting, by Dr. LOWER.

Dr. ALLEN gave an account of a person, who had lately lost a quantity of his brain, and yet lived and was well.

He was desired to bring this relation in writing to be registered.

Dr. CLARKE seconded this story, by mentioning, that Sir GERVASE SCROOP was an instance of the like nature; adding, that many had survived the loss of a part of their brain; but that none, whom he had ever heard or read of, whose spinal marrow was hurt, were cured.

Mr. HOOKE related, that Sir WILLIAM STRODE had assured him, that he knew a man, who had a hole in his skull, through which it was seen, that his brain grew turgid at the full and flaccid at the new moon. He was desired to bring the account of this in writing from Sir WILLIAM STRODE.

Mr. OLDENBURG produced a paper of Mr. BOYLE sealed up, which had been sent to him to be deposited with the society, containing some notion or invention of Mr. BOYLE not yet perfected. Mr. OLDENBURG was desired to deliver it to the president, that he might lay it up*, according to an order made by the council November 16, 1667, concerning the depositing of such papers with the society.

Mr.

* Mr. OLDENBURG in a letter to Mr. BOYLE of Feb. 18, 1673, printed in Mr. BOYLE's works, vol. v. p. 384, mentions, that the president not being at the meeting of the society on the 15th, Mr. BOYLE's paper was ordered to be delivered to him, and that the president upon receiving it, two or three days after, put it in Mr. OLDENBURG's presence in a box by itself, after he had written on it the day and year of his receiving it,

as Mr. OLDENBURG had done the same minute it came to his hands. " One of the company, adds he, though in another place, objected, that the matter not being named of such notions or inventions, it might happen, that another might light on the same thing, and not only have it in his conception, but also bring it to perfection; and that in such a case he ran the hazard of losing the honour of what he had done and perfected

Mr. OLDENBURG produced a large account of the method of agriculture practised in Devonshire and Cornwall, sent by Mr. COLEPRESSED, and dated 6 Feb. 1667. It was ordered to be hid up with the rest of the accounts of husbandry.

This gave occasion of reminding those of the society, who had formerly engaged to procure the like accounts from other parts of England, to discharge themselves of their several engagements. The earl of Devonshire undertook to procure an account of the agriculture used in Derbyshire, and Mr. WALLER of that of Buckinghamshire; and they both desired to be furnished with the inquiries drawn up and printed for that purpose.

Dr. AGLONBY desiring to have the inquiries for the East-Indies, in order to send them into those parts, for which he had now a good opportunity, it was ordered, that they should be delivered to him.

Dr. CHARLETON presented a mineral, which he thought to be a kind of gypsum or soft alabaster, with long fibres. He was desired to send for a larger quantity of it, to melt and make trials with it, of which Dr. GODDARD was desired to take care.

The experiments appointed for the next meeting were,

1. The wind-gathering vessel :
2. The cutting out the tympanum of a dog's ear.
3. Shining wood and fish.
4. Binding up the descending artery of a dog.
5. Weighing mineral bodies single and compounded in the air and in water.
6. To bring in several descriptions, viz. of the new cyder-engine, of the new pendulum moving strait without any checks; of the astronomical instrument dividing a foot into many thousand parts.

February 17. At a meeting of the COUNCIL were present

" perfected upon the account, that another before
 " him had given a hint of the same thing. To
 " this I thought I could justly reply, that such
 " notions and discoveries being sealed up, and
 " thereby kept from coming to the knowledge
 " of others, if another should light upon and
 " perfect the like, it would then be manifest to
 " all the world, the latter had it not from the

" former; and therefore the society would be so
 " just as to testify so much, and withal to add
 " upon occasion, that the latter had not only
 " conceived such and such a thing without being
 " beholden to others for it, but also rendered it
 " complete or useful, according as the matter
 " may be."

The

The President

Sir PAUL NEILE
Mr. AERSKINE
Sir GEORGE ENT
Dr. WILKINS

Mr. HOSKYNs
Mr. COLWALL
Mr. OLDENBURG.

It was ordered, that the president, the lord bishop of SALISBURY, Sir PAUL NEILE, Sir ANTHONY MORGAN, and Dr. WILKINS be desired to meet on the Wednesday following, between nine and ten in the forenoon, in the painted chamber Westminster, in order to speak with the lord privy-seal about the business of taking the oaths of allegiance and supremacy.

Dr. WILKINS desired leave to take from the stationer half a dozen copies of the *History of the Royal Society*, to be presented to some persons, from whom he expected contributions; and leave was allowed him.

Mr. OLDENBURG moved the council to grant a letter recommendatory to Mr. SAMUEL COLEPRESSE, an ingenious and studious person, ready to travel, who had furnished the society with several very good and philosophical accounts concerning mines, tides, and agriculture. This motion was consented to, and Mr. OLDENBURG having a Latin draught of such a letter ready, it was read and approved of, as follows:

“Cum præsentium lator Dr. SAMUEL COLEPRESSE, vir probus & eruditus, rerumque naturalium perquam curiosus, præstitutum animo habeat oras externas studiorum gratiâ invilire, ibique doctorum et solertium virorum consuetudinem ambire, rogaveritque præsidem & concilium societatis regię à serenissimo Magnę Britannię rege Londini ad scientiam naturalem augendam institutę, ut literis suis commendatiis propositum ejus ornare & promovere dignarentur: prædictus præses & concilium de ingenio & probitate lectoris satis superque persuasi, id ipsi humanitatis officium lubentissime præstare voluerunt, proindeque omnes literarum & literatorum amantes enixę rogant, ut præmemorato Domino SAMUELI COLEPRESSE favore & consilio suo adesse, studiique & conatus ejus pro viribus juvare ne graventur. Quam gratiam utique præses & concilium dictę societatis pari officiorum genere, pro re natâ, agnoscere & redhostire annitentur. In cuius rei testimonium præfentes hæc sigillo suo munire voluerunt. Script. Londini anno Regni CAROLI II. augustissimi M. Britannię, Francię, & Hibernię Regis vigesimo, ærę autem Christiænę, MD. CLXVIII. die 17 Februarii.”

It was ordered, that this letter be written fair on parchment for the next meeting of the council to have the society's common-seal affixed to it.

The business of the conveyance of the land given by Mr. HOWARD was referred to the next meeting of the council.

Dr. WILKINS subscribed fifty pounds, as a contribution for building the society's college.

VOL. II.

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It

It was ordered, that Dr. WILKINS be desired to speak to Dr. CROUNE to draw up a letter to be sent by the president to the dutchess of NEWCASTLE, to desire her contribution to the building of a college.

Feb. 20. At a meeting of the SOCIETY,

Mr. WARD was elected and admitted.

Mr. FLOWER was elected.

Dr. CLARKE mentioned, that there was a poor distracted woman, who seemed to him a fit subject to try the transfusion upon; but that she not being provided for, it was to be feared, that she would lie upon the society's hands, after the experiment should be made upon her. He was therefore desired to speak with some of the officers of the parish, where she was then maintained, that in case they would continue to provide for her, the transfusion should be made upon her, as a means, which the physicians thought not unlikely to cure her.

Dr. WILKINS produced a paper sent by Dr. WREN, giving an account of a strangely diseased boy about Oxford, having a consumption of the bones about his head, which bones he pulled out in fragments, whereof some single ones weighed an ounce, though he was born of healthy parents, and had been healthy himself till of late. Some members inquired how the bones pulled out were coloured: others suggested, that information should be desired what nurse the boy had. Whereupon it was ordered, that Dr. POPE should be desired to write to Dr. MILLINGTON², and Mr. OLDENBURG to Dr. WREN, to be informed by them of those circumstances and such others as were remarkable in that patient; as also to learn, whether Dr. WREN, from whom the above mentioned account came, had himself seen the boy.

Mr. OLDENBURG procured a letter written to him from Paris February 18, 1668, N. S. by Monfr. CARCAY, chief keeper to the French king's library and cabinet of medals and one of the principal philosophers of the Royal Academy of sciences in that city; in which letter Monfr. CARCAY offered a correspondence³. It was ordered, that since this letter seemed not to be written in the name of that academy to the society, but only by a single member thereof, expressing his desire to correspond; Mr. OLDENBURG should only as from himself thank him for his offer, and entertain a correspondence with him upon philosophical matters⁴.

² THOMAS MILLINGTON, M. D. afterwards knighted.

³ Letter-Book, vol. ii. p. 153. See likewise Mr. OLDENBURG's letter to Mr. BOYLE of Feb. 25, 1667, printed in Mr. BOYLE's works, vol. v. p. 385.

⁴ Mr. OLDENBURG in his letter last cited re-

marks upon this order: "This I was not very well satisfied with. I see punctilio's retard and obstruct much good both public and private: but I must submit." Mr. OLDENBURG's answer to Monfr. CARCAY was dated Feb. 24, 1667, Letter-Book, p. 157.

Dr.

Dr. WILKINS mentioned, that Mr. SMETHWICK had now made ready a telescope four feet long, with glasses not spherical, performing better than any spherical ones; and that he intended to shew them to the society.

The wind-gathering vessel was again produced, but being yet unfinished, it was ordered to be perfected and produced again at the next meeting, after it had been tried in private.

The experiment of weighing tin and copper was made, so as two pieces of those two metals were weighed, both asunder and mixed, in the air and water; whereby it appeared, that the compound was heavier than the parts separated. Mr. Hooke was ordered to give an account of it in writing; as also to bring in the description of the new cyder-engine, the astronomical instrument, and the new pendulum moving strait without any check.

It was likewise ordered, that the experiment with shining wood and fish be made at the next meeting; and that Mr. SMETHWICK be spoken to by Dr. WILKINS to produce his new glasses at the next meeting*.

Feb. 24. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Mr. AERSKINE
Sir PAUL NEILE

Sir ANTHONY MORGAN
Dr. WILKINS
Mr. HAYES
Mr. HOSKYNES
Mr. OLDENBURG.

It was ordered, that the bishop of SALISBURY be desired to inquire of the lord ARLINGTON, whether the patent concerning his Majesty's grant of Chelsea-college to the Royal Society and some additional powers to their charter, may not pass by the King's immediate warrant, since the lord privy-seal required from the officers of the society the taking the oaths of allegiance and supremacy:

That the operator of the society constantly attend the president on Sundays, to receive his orders for summoning the council; and that he always summon the council the night before they are to meet, on the penalty of losing the payment allowed him for summoning: and

That the recommendatory letter for Mr. COLEPRESSE, agreed upon at the last

* At this meeting of the society of Feb. 20. were present Signor MAGALOTTI and Signor FALCONERI, two philosophers of the Florentine academy; but they came late, when the president was not in the chair, *whose singular dexterity,* says Mr. OLDENBURG to Mr. BOYLE, *in ma-*

naging whatever is proposed, you well know. There was only made therefore before them the experiment of weighing tin and copper. See Mr. OLDENBURG's letters of Feb. 11, and 25, in Mr. BOYLE's works, vol. v. p. 383, and 385.

meeting of the council, be sealed by the president with the common seal of the society.

The lord bishop of SALISBURY subscribed one hundred pounds towards the building of the college.

Feb. 27. At a meeting of the SOCIETY,

There were admitted to be present the young Swedish count DE LA GARDIE, and the two Florentine philosophers, Signor LORENZO MAGALOTTI and Signor PAULO FALCONIERI.

Mr. SMETHWICK produced some optic and burning-glasses, which he affirmed to be of his own invention and preparation, to be of a figure not spherical, and which, as highly desirable for the farther discoveries of nature, he had for many years together painfully searched after, now presenting this invention of his to the judgment of the Royal Society, as being a member thereof^{*}.

Dr. ALLEN communicated the written account, promised by him February. 13. of the loss of a part of a man's brain without any considerable prejudice to the patient: which account was ordered to be registered[†], as follows:

" December 14, 1667, THOMAS BARNOD, waterman, and servant to WALTER
" HOLLOWAY, received a blow upon the temporal muscle with a Fletcher, which
" immediately tumefied, and there followed the usual symptoms of a fracture of
" the cranium, viz. vomiting, bleeding at the nose and ears, and a profound deli-
" rium. The surgeon was sent for (notwithstanding his condition was thought
" hopeless) who presently came, and having opened a vein in his arm, made a
" semicircular incision through the upper part of the said muscle, and dividing the
" pericranium discovered the fracture; but fearing there might not be a sufficient
" breathing, made another incision, which was oblique, and afterwards a third, which
" was semicircular, through the dependent part of the muscle, so that the whole
" muscle was in a manner divided, and there was discharged about two spoonfuls
" of the substance of the brain. I objected, that possibly it might have been pus;
" but he well assured me, that in all probability there couldnot be any suppuration in
" so short a time, it not being above two days after the blow was given, that this
" issued forth. Besides, he told me it was of a different consistence from pus.
" The muscle being thus divided, he found a large fracture and depressure of the
" os squamosum, and part of the os petrosum, so that one part rid over the
" other, which he rasped off, and not knowing how to raise the depressed part,
" applied the trepan upon the most sound part, which was the most depending of
" of the futura coronalis, and so with the elevatory gently raised the shattered
" skull, upon which the former symptoms were moved, and some time after.

^{*} The account of these glasses from the journal book of the Royal Society is printed in the Philosoph. Transact. vol. iii. n^o 33. p. 631. for

March 1667.

[†] Register, vol. iii. p. 287.

"there was good digestion and several splinters of bones cast forth. When Dr. TERNE and I first viewed it, which was about a month ago, he was in a hopeful condition, and in very good temper, and began to incarnate. The doctor was so curious as to search the depth of the wound with a silver probe, which, without any force from his hand, passed an inch through both the meninges into the substance of the brain. At this time he walks abroad, and is very hearty, finding as yet no other inconvenience but that he hath not the freedom of his speech, nor quickness of apprehension as formerly; nor can he open his mouth so well, nor chew hard things."

Dr. BROWN of Norwich presented to the society a great petrified bone, a double-goose-egg, the one included in the other, and a stone-bottle, which had been filled seven years before with Malaga sack, and was well stopped, but now found almost empty, and the outside covered all over with a mossy coat*.

The president, to whom Mr. JAMES GREGORY's book, intitled, *Vera Circuli et Hyperbolæ Quadratura in propriâ surâ proportionis specie inventa et demonstrata*, printed at Padua in 1667 in 4to⁷ had been recommended, gave this account of it, that it was very ingenious and worthy to be studied; that in it the author had delivered a new method for giving the aggregate of an infinite or indefinite converging series; and taught a method of squaring the circle, ellipsis, and hyperbola by an infinite series, calculating thence the true dimensions as near as was desired: and farther, that by the same method from the hyperbola he calculated both the logarithms of any natural number assigned, and *vice versa* the natural number of any logarithms given*.

Mr. OLDENBURG produced another mathematical book, sent him from Paris, intitled, *Specimina Mathematica FRANCISCI DA LAURENS*; which was likewise recommended to the perusal of the president.

Mr. OLDENBURG read a letter written to him by Dr. JOHN PALMER, archdeacon of Northampton, dated at Ecton February 24, 166 $\frac{1}{2}$, giving an account of his attempts of solving all algebraical questions by the *regula falsi*. He mentioned, that in the years 1638 and 1639, there had passed divers letters between Mr. JENNISON of Archeiter and himself on that subject, in which the doctor had avouched it to be probable, that the rule of false might do as much as the rule of algebra; but that he never professed more than an opinion of that probability; and relolved some of Mr. JENNISON's questions not solvable by common arithmetic, but others he could not solve. He then remarked, that what induced him to think the rule of false as competent as that of algebra, was, that the nature of the questions is the same (for in both the *numerus constructus* and the *modus construendi* are given, and the *primus structor* or *structores* are sought) and the rules are very like, though in the rule of false the extraction of roots be not commonly practised.

* An account of these is published in Dr. Hooke's Philosophical experiments and observations, p. 31. for the author's own use and that of his friend. Philos. Transact. n^o 33. p. 641.

z Ibid.

7 A few copies only were printed of this edition.

His opinion was confirmed by PITISCUS, who *Trigon. lib. v. in append.* says, *regula falsi in trigonometria tam magnum usum habet, ut discipulum ejus artis à tricis algebraicis prorsus liberare possit.* It was ordered, that Dr. PALMER should be encouraged in his undertaking by a letter of thanks, and that his letter should be entered in the society's Letter-Book *.

MR. OLDENBURG read a letter written to him from Mr. COLEPESSE dated at Underwood Feb. 22, 1667^b, acknowledging the society's favour in gratifying him a commendatory letter in his foreign travels, and offering his service in making inquiries of a philosophical nature among intelligent men in foreign parts. It was ordered, that such queries should be sent to him by Mr. OLDENBURG, as are usually recommended to philosophical travellers.

Dr. ALLEN related, that there was taken out of the bladder of Sir THOMAS ADAMS^c lately deceased a stone said to weigh twenty five ounces and three quarters, having in the midst a gutter, through which the urine had probably passed. He added, that the patient had not been heard to make any great complaint of inconvenience till his last distemper, of which he died. He promised to endeavour to procure a sight of the stone for the society.

The experiment of compressing air upon a shining fish was made, which succeeded according to expectation; the light of the fish appearing more vivid after the compression than before.

There was made likewise the experiment of compressing the descending artery in a dog, to see, whether thereupon the motion of the animal would quite cease. Dr. LOWER, who had the care of the experiment, made this report, that he had only made the compression of that artery with his finger, and had not found the effect related by Mr. STENO in his *Musculi descriptio geometrica*. It was ordered, that Dr. LOWER should be desired to report the experiment at the next meeting by making a close ligature, as Mr. STENO had done, and that by opening the abdomen; and Dr. CLARKE, Dr. CROUNE, and Mr. HOOKE, were desired to assist in the experiment.

The new cyder-engine being again spoken of by Mr. PACKER, it was ordered, that Mr. HOOKE should take care of having one made of that kind, not exceeding forty shillings.

Mr. HOOKE produced a more exact contrivance of scales for the weighing of bodies both in the air and water. It was ordered, that these experiments should be prosecuted at the next meeting: and

That the vessel for contracting of the wind, with the alterations formerly appointed to be made, be produced at the same meeting.

* Vol. ii. p. 158.

^b Ibid. p. 155.

^c Lord Mayor of London in 1660.

March 5. Dr. LOWER made again Mr. STENO's experiment of opening the abdomen of a dog, and therein tying up very close the descending artery. But the animal, though appearing benumbed and motionless in his lower parts, whilst bound fast, yet, when let go, went upon all four legs; though the mid artery remained strictly tied. It was ordered, that Dr. LOWER should be desired to try the same experiment at the next meeting on the ascending artery; and that STENO's book should be again consulted, to see the circumstances there set down in the description of that experiment.

Dr. CLARKE moved, that the experiment might be tried in some large fish.

Sir GEORGE ENT communicated Mr. JOHN GREAVES's description of the manner of hatching chickens at Grand Cairo; which was read, and ordered to be registered.

Mr. HOOKE moved, that some ways might be considered of, to practise the hatching of chickens in England, without any animal; and having suggested the lamp-furnace, and a certain sweet substance keeping heat for many days (which he did not think fit to name then) he was desired to make the experiment in the best manner he could think of, and to give the society an account of its success.

The account of the performances of Mr. SMETHWICK's new optic-glasses being read, it was moved, that they might be tried once more, by comparing them with spherical glasses, before they passed abroad with the attestation of the society. This being approved of, Mr. HOOKE was desired to provide accordingly for the next meeting as good spherical glasses as he could procure, both for a telescope, reading and burning-glasses; which he undertook to do.

The wind-gathering vessel with some improvements was again exhibited, and appeared to be sensible of the least wind near it. It was ordered, that a description should be made of it, together with a scheme, and registered.

Mr. HOOKE suggested, that such a vessel as this might, by some variation, be turned into a good otacousticon: upon which he was desired to procure one to be prepared against the next meeting.

March 12. Mr. SMETHWICK's glasses were tried again; and his telescope being compared with another longer telescope, and the object-glasses exchanged, was still found to exceed the other in goodness; and his burning concave being compared with a spherical burning-glass of almost twice the diameter, and held to the fire, it burnt gloves, whereas the other spherical ones would not burn at all. Mr. SMETHWICK was encouraged by the society to proceed in this invention with all possible vigour; and because the sky was not at that time clear, it was desired, that the telescope might be produced once more at the next meeting.

* Register, vol. iii. p. 291. It is printed in 1677. and Mr. GREAVE's Miscellaneous works, the Philos. Transact. n^o 137. p. 913. for JANUARY vol. ii. edit. London. 1737.

Mr. Hooke made a proposal of a new way of his to grind optic-glasses, which he was desired to give in writing.

Sir ROBERT SOUTHWELL being lately returned from Portugal, where he had been ambassador from the king, and being desired to acquaint the society with what he had done with respect to the instructions, which he had received from them before his departure from England, related, that he had lodged the astronomical quadrant, which the society had lent to Portugal to make observations with there, with a body of men at Lisbon, who had applied themselves, among other kinds of literature, to mathematics; and among whom a gentleman, named Don ANTONIO ALVAREZ DA CUNHA, had desired him to procure for him the honour of being received into the society: whereupon he was put to the ballot, and elected.

There was presented to the society by Signor MAGALOTTI and Signor FALCONIERT in the name of prince LEOPOLD of Tuscany, and as a mark of his highness's esteem of the society, the book of experiments of the academy *del Cimento* at Florence, intitled, *Saggi di Naturali Esperienze fatte nell' Accademia del Cimento in Firenze*, printed in that city in 1667 in fol.

The heads of this book being read, the presenters received the solemn thanks of the society*, together with an intimation, that a letter of thanks should be written to the Prince for his singular favour to the society; which letter Mr. OLDENBURG was desired to draw up in Latin.

It was likewise ordered, that Dr. MERRET and Dr. BALLE should be desired to peruse this book, and to give the society an account of the contents of it, and the manner of treating the several subjects in it.

An attempt was again made of the experiment of tying up the artery of a dog; but not succeeding it was referred to a private trial.

Mr. Hooke brought in a description of the wind-gathering vessel, but took it home again, promising to return it at the next meeting.

Sir THEODORE DE VAUX read part of a letter to himself from Mr. JOSEPH WALSH, mentioning pieces of a rock in England, upon which were found moss, fern, sticks, a piece of wood, blackberries and wild raspberries, all petrified. It was desired, that some pieces of this rock, on which those things were found, might be sent for; which Sir THEODORE undertook to do.

The experiments of weighing bodies of two mixt metals, made heavier than the metals apart, both weighed together, should be prosecuted at the next meeting.

* Which Mr. OLDENBURG was ordered by his letter to Mr. BOYLE of March 17, 1667, the president to deliver in Latin, as appears from printed in Mr. BOYLE's works, vol. v. p. 383.

March 19. Some account was given by Dr. POPE and Mr. HOOKE of the book of the experiments of the academy *del Cimento*, which was, that the many subjects and experiments treated of in it had also been considered and tried in England, and even improved beyond the contents of that book; but that they were delivered in it with much accuracy and politeness, and some of them with an acknowledgment of the origin, whence they were derived.

It was ordered, that Dr. MERRET and Dr. BALLE, to whom the perusal and examination of this book had been referred at the preceding meeting, should be desired to give in likewise their thoughts of it^f.

It being mentioned, that in the said book there was related an experiment of making organ-pipes sound in an exhausted receiver, by blowing them there with bellows; it was ordered, that Mr. BOYLE, as the person, who had been the first known to have suggested this experiment, should be desired to make it; or, if he had already made it, to acquaint the society with the success of it.

Dr. POPE remarked, that the Florentine academy had delivered in their book an experiment, whereby they found, that sounds moved equally swift with and against the wind, though not equally strong or audible; and that they moved an Italian mile in five seconds.

It was remarked hereupon, that Mr. ROOKE had made trial of the latter experiment, and found, that sounds moved five English miles in twenty seconds, which is one mile in four seconds; where it is to be considered, that an English mile is somewhat longer than an Italian.

Dr. POPE read the letter sent by Dr. MILLINGTON from Oxford about the strangely diseased boy, mentioned at the meeting of Feb. 20, 1667; and it was ordered to be entered in the Letter-Book. But Dr. POPE did not deliver the letter, excusing it, that there were private particulars in it.

Mr. OLDENBURG delivered a book sent by the author, Mr. JAMES GREGORY, from Padua, to the honourable HENRY HOWARD of Norfolk, to be presented to the society, intitled, *Vera Circuli et Hyperbolæ Quadratura*; of which an account had been given on the 27th of Feb. by the president, who had a copy of the book shewn him by Mr. COLLINS.

A description of an instrument for collecting the wind, or for making the slower motions of the air more sensible, contrived by Mr. HOOKE, was read, and ordered to be registered^g, as follows:

^f Dr. MERRET in a visit to Mr. OLDENBURG on the 24th of March 1667, informed him of his design to read that book thorough with attention, and to compare it with what he knew to have been

already done in England. See Mr. OLDENBURG'S letter to Mr. BORLÆ of that day in Mr. BOREL'S works, vol. v. p. 350.

^g Reginer, vol. iii. p. 294.

“ It was contrived by Dr. CROON, to include a fan in a cylindrical vessel, and
 “ to divide the whole circumference thereof into thirty-two or more equal parts,
 “ and at those several divisions, to cut slender slits for the air to be admitted by
 “ those narrow passages into the cavity of the cylindrical box; as supposing the
 “ air moved affected to move swifter through any narrow crevice: but upon con-
 “ sidering the matter, I found, that a contrivance of that kind did very much
 “ shroud and shelter the fan, placed in the center of the cylindrical box, from
 “ being moved by the motion of the air, and not in the least conduce to the
 “ making it sensible. To remedy therefore this inconvenience, I contrived an
 “ instrument after such a manner, that the boxes and cells thereof should collect
 “ as great a quantity of air in motion, as could enter a square hole every way
 “ as big as the greatest diameter of the instrument, and contract it into as small
 “ a passage as was desired; by which means it is possible to make the slowest and
 “ most imperceptible motion of the air to be equal to the greatest and most swift.

“ The contrivance, in short, was this: I caused two hollow tin cones a, b, c, d, e ,
 “ and a, f, g, h , to be inverted and meet each other in the common vertex or point
 “ a : then dividing the limb of each into 32 equal parts, I caused to be cut so
 “ many triangular valves or partitions $a, b, f, a, i, u, a, p, q, a, i, k, a, e, g, a, l, m$,
 “ $a, n, o, a, r, g, a, d, b$, &c. as there were divisions, cutting off only an equal
 “ triangular bit at the top of them, or towards the center a , as that they might
 “ leave a cylindrical hole in the center of this instrument, fit to contain a small
 “ vane or weather-cock. These valves or partitions were foldered on between
 “ the two cones, in the manner express’d in the figure; by which means, all the
 “ air, that was moved against the side of the cylinder f, b, c, d, h, g , was collected
 “ to pass through the narrow small holes, making up the little square at a , and
 “ thereby consequently the motion of the air through the holes, or outlets, to the
 “ motion of the air through the greater mouths or entries, was in reciprocal pro-
 “ portion to the area of those holes; that is, as the area of the greater holes or
 “ inlets, to the area of the lesser holes or outlets, so the velocity of the motion of
 “ the air in the smaller holes, to the motion of the air in the greater. By
 “ this contrivance, it is easy to make a ball at the top of a steeple-turret, &c.
 “ that by the air’s blowing of a pipe contrived in it, the quarter and strength of
 “ the wind may at all times, either by night or day, be easily discovered. By
 “ somewhat a like contrivance also may be made an instrument for collecting the
 “ sounds dispersed in the air, into one small channel or pipe, to be applied to the
 “ ear, by which means the hearing may be much augmented and bettered.”

It being mentioned in this description, that by a somewhat like contrivance there might be made an instrument for collecting the sounds dispersed in the air into one small pipe, to be applied to the ear, to serve for an otacousticon, it was ordered, that Mr. HOOKE should cause a great glass-receiver to be made for that purpose.

Mr. HOOKE produced his newly contrived cyder-engine, which being tried, but found not to go close enough for expressing out all the juice of the apple at once, it was ordered, that it should be made to go closer against the next meeting.

The

The business of improving optic-glasses being again spoken of, Mr. Hooke observed, that Mr. COXE had affirmed to him, that he would make a spherical glass of the same power with those of Mr. SMETHWICK, declared not to be spherical, which should perform the same effects, of taking in as great an angle, and representing the object as distinctly and truly, as Mr. SMETHWICK's glasses. It was ordered, that Mr. COXE should be desired by Mr. Hooke to make good his affirmation.

Dr. KING informed the society, that he had made the experiment of tying up the artery in a dog, according to Mr. STENO's suggestion, but without success. He was desired to bring in this account in writing.

Mr. OLDENBURG produced two small anatomical tracts written by REGNERUS DE GRAAF and JOHN VAN HORNE, both physicians at Leyden, the former intitled *Epistola de nonnullis circa partes genitales inventis novis*; and the latter, *Observationum circa partes genitales in utroque sexu prodromus*; both printed at Leyden in 1668, in 16°, and pretending to contain some new discoveries about the parts of generation, as that the *testes* are not glandular, but a compages of strings, rendering them capable to be wholly drawn out into length; and that the *testes mulierum* are like the *ovaria* in fowl, &c. It was ordered, that Sir GEORGE ENT should be desired to peruse these books, and to give his thoughts of them to the society.

Mr. Hooke produced a lamp-furnace for hatching of eggs in it. The experiment was ordered to be tried without delay.

Mr. OLDENBURG read the Latin letter ^b, which he had drawn up by order of the society, for returning their thanks to Prince LEOPOLD of Tuscany, for the book of Florentine experiments presented to them in his name: Which letter being approved of, the president was desired to seal it in council, according to the order of the charter.

The experiments appointed for the next meeting were

1. The glass-receiver to increase the sound for better hearing.
2. The weighing metalline bodies, both mixt and asunder.

1668, March 26. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
Mr. CHARLES HOWARD
Mr. AERSKINE

Mr. COLWALL
Mr. CREED
Mr. OLDENBURG.

The Latin letter of thanks to Prince LEOPOLD for his present of the book of the Florentine experiments was read, signed by the president, and sealed; and

^b Letter-Book, vol. ii. p. 177.

Mr. OLDENBURG was desired to deliver it to Signor MAGALOTTI and Signor FALCONIERI, who had presented that book to the society from the Prince.

It was ordered, that Mr. HOOKE at his first leisure attend Mr. CHARLES HOWARD to view the reparations made in Chelsea-college, and make a report thereof to the council.

At the meeting of the SOCIETY on the same day,

The president produced his own method of squaring the hyperbola by an infinite series of rational numbers; which was ordered to be registered¹.

Dr. ALLEN produced the stone lately taken out of the bladder of Sir THOMAS ADAMS, which being weighed before the society, was found to weigh twenty-two ounces and three eighths Troy weight. Mr. HOOKE was ordered to take the dimensions and draw the figure of it; and Dr. ALLEN was desired to procure an account in writing of all the observables, that occurred about this stone, when it lay yet in the bladder, and was taken out; as also of the accidents observed in the patient during his life-time, and particularly, whether it were true, that he did not complain of any great inconvenience from the stone till a few days before his death.

The president produced a relation communicated to him by the lord HERBERT, concerning a live toad found in a sound ash-tree, and in the solid part thereof, lying in a hole no bigger than a just mould for the body. It was ordered to be filed up.

Dr. CHRISTOPHER WRN communicated a letter written to him from Oxford March 19, 1667, by Dr. THOMAS JAMESON, concerning the strangely diseased boy, of whom Dr. POPE had given in at the last meeting an account in writing. This letter was ordered to be inserted in the society's Letter-Book².

Mr. OLDENBURG informed the society, that one Mr. HAY had given him notice, that a friend of his residing at Rome had by a letter signified to him, that he could and was ready to procure for the society a correspondence through all parts of the world, by means of the Romish missionaries; but that it would require some expence for letters. It was ordered, that the gentleman, who offered to procure this commerce, should be thanked for his respect to the society, as well as Mr. HAY for acquainting them with it; and that the offer should be embraced; the charges of foreign letters relating to the society being taken off in England by the favour of the lord ARLINGTON.

Dr. MERRET being called upon for an account of the book of Florentine experiments, desired some longer time, and alledged, that he intended to compare the

¹ It does not appear in the Register, but is p. 645, for April 1668.
printed in the Philos. Transact. vol. iii. n^o 34, ² Vol. ii. p. 184.

contents thereof with what had been performed and published in England on the same subjects.

It being mentioned again, that the Florentines had affirmed, that sounds move equally swift against and with the wind, it was suggested by the president, that the experiment might be conveniently enough made between Deal and Dover, and that he would desire the governor of Deal-castle to take care of it.

Mr. Hooke gave a hint of making glasses, by which one might see and read in the dark. He was desired to think farther of it, and to make some trials accordingly.

The experiments appointed for the next meeting were the same, that should have been made at this, but were not.

Mr. OLDENBURG presented his second volume of the *Philosophical Transactions* to the society.

April 2. Sir JOHN COLLADON was proposed candidate by Mr. POVEY.

Dr. KING brought in an account in writing, that the experiment, which he had made in private, of tying the descending trunk of the aorta in a dog, succeeded no more with him, than it had done, when made in public before the society. It was ordered to be registered¹, only to shew, that the experiment being made after such a manner, did not succeed. The account was as follows.

"In order to your commands concerning Mr. STENO's experiment about tying the descending trunk of the aorta: I opened the side of a dog, and divided two ribs from the back-bone, so that I could see plainly the great artery: then I put a packthread about it, and drew both ends through a tobacco-pipe (the dog being loose tied) I pulled with my right hand the strings, and pressed down the end of the pipe with my left hand, that by that way, I could stop the motion of the blood, &c. in the artery, and give way again at pleasure: And I do believe for the time I held it in the foresaid posture, that the blood, &c. was as much stopt, as in the hardest knot I can tie: Yet I could not observe, that, as Monsr. STENO would have it, the dog lost the motion of the hinder parts. Afterwards I pierced a hole through, on the other side, and drew a thread under the spine, and got it about the artery, and drew as fast a knot as I could about the artery, and I found the dog had motion, till all was forced to cease, by reason of the suffocation of the whole."

Mr. Hooke produced a glass receiver for the improvement of hearing. Being tried by holding the neck of it to the ear, it was found, that a stronger sound was conveyed

¹ Register, vol. iii. p. 295.

by it, than would have been without it. It was ordered, that at the next meeting there should be brought a better and larger receiver for hearing.

He mentioned, that there was a person, who offered his service to the society for diving; which offer was accepted of, and Mr. Hooke ordered to consider against the next meeting of the apparatus for it, and of the experiments to be made by it.

Mr. POVEY informed the society, that there was an acquaintance of his going by land to Persia and farther into the Indies, who was ready to do the society what service he could in his travels. It was ordered, that the queries proper for those countries, printed in n° 23 of the *Philosophical Transactions*, should be recommended to him; and they were accordingly delivered to Mr. POVEY for him.

Mr. OLDENBURG produced and read a letter written to him by Mr. SALVSIUS from Leige, March 29, 1668, N. S. containing a general description of the country of Leige, and an offer of a particular one, if desired. It was ordered, that Mr. OLDENBURG should suggest subjects to him for a more particular account, and that his letter should be entered in the Letter-Book of the society.

Occasion being given by Mr. POVEY discoursing of some Indian serpents, Dr. POPE related, that Sir ANDREW KING had assured him, that he had met in Spain in his own lodgings, with several amphibiaena's, and opened both mouths of them, and taken feed out of them.

Dr. GODDARD remarked, that perhaps these serpents might be monstrous, composed of two imperfect serpents growing together in the middle.

Captain SILAS TAYLOR presented the society with several small pieces of good succinum taken up on the shore at HARWICH^a; as also with a piece of wood perfectly petrified.

It was remarked, that the like amber was frequently taken up on the coasts of Suffolk and Norfolk; whether natural to that sea, or accidental by shipwreck; was doubtful.

Mr. OLDENBURG read a Latin letter of Dr. WALLIS to himself, dated at Oxford March 7, 1667, concerning the highest annual tides happening in the intermediate times between the perigee of the sun and the equinoxes: Which letter was ordered to be registered.

^a It does not appear there, but an extract of it is cited in Mr. OLDENBURG's letter to Mr. BOYLE of March 30, 1668, printed in Mr. BOYLE's works, vol. v. p. 392.

^b Where he was keeper of the King's store-

houses, Wood Athen. Oxon. vol. ii. p. 624.

^c Letter Book, vol. ii. p. 163. It is printed in English in the *Philos. Transact.* n° 34, p. 652, for April 1668.

The experiments appointed for the next meeting (besides the abovementioned receiver for hearing, and the diving experiments) were the cyder-engine, the weighing of metalline bodies, the glass for seeing in the dark, and Mr. COX's telescopical glasses equal to those of Mr. SMETHWICK.

April 9. Mr. HOOKE produced two receivers, one of which was of latten, and of a conical figure, the other of glass and round, both sharp at one end. Being applied to the ear, the former was judged best for the increasing of sounds: Mr. HOOKE was ordered to take them home, and try them farther by himself, and particularly during the silence of the night, and to bring in an account of their effects.

Mr. CHARLES HOWARD presented the society with two boxes of various seeds sent him from Padua. He was desired to sow some of them, and the amanuensis ordered to copy the list of them.

Mr. OLDENBURG produced a paper in Latin by Don ANTONIO ALVAREZ DA CUNHA, dated at Lisbon, 11 Feb. 1668, N. S. giving power to Sir ROBERT SOUTHWELL to procure him to be admitted into the Royal Society, and offering his service for the promotion of their designs. This gentleman having been already elected a fellow, on the 12th of March, it was thought proper to send him a diploma, giving public notice, that he was so, and a form of such a one being prepared by Mr. OLDENBURG, it was read, approved, and ordered to be sealed with the common-seal of the society.

The form was as follows.

" Praefes, concilium, & sodales Regalis Societatis Londini ad scientiam naturalem promovendam institutæ omnibus & singulis, ad quos praesentes pervenerint, salutem.

" Cum virtute & variarum rerum experientiâ, nec non mathematicis scientiis clarus.
 " Dominus ANT. ALVAREZ DA CUNHA, villæ Taboæ dynasta, serenissimi Lusitanæ regis archidapifer, in ordine Christi commendatarius commendæ S. MICHAELIS de Noqueira, urbanae legionis è quatuor in praesidio Olyssiponenfium tribus, ejusdem civitatis generosorum academiarum à secretis, singularem suum in societatem regalem affectum, ejusdemque studia juvandi promptitudinem humanissimis suis literis Olyssipone d. 11 Febr. anno 1668, datis uberrimè fuerit testatus, inque iisdem generosum equitem Dominum ROBERTUM SOUTHWELLUM, serenissimi Magnæ Britanniae, &c. Regis CAROLI secundi in Lusitaniam ablegatum, nec non dictæ societatis regalis consortem benè meritum potestate amplissima instruxerit collegæ in cætu isto locum & jura ipsi impetrandi; dicta proinde societas egregia laudati Domini ANTONII DA CUNHA in rem literariam & philosophicam merita, ut par est, secum expendens, ipsum die 12 Martii, 1668,

Letter-Book, vol. ii. p. 151.

Ibid. p. 181.

" in

“ in solenni confesso, conspirantibus omnium suffragiis, in sodalium suorum album cooptavit, nullatenus dubitans, quin allectus hic in curiam suam novus socius tanti nominis mensuram, tum prolixa voluntatis propensione, tum assidua studiorum confociatione sit impleturus. In cujus rei testimonium dicta societatis sigillum suum præsentibus hîsce affigi curavit. Scriptum Londini die 9 Aprilis anno ære Christianæ MD.CLXVIII. Regni CAROLI II. augustissimi Magnæ Britannîæ, &c. Regis, dictæ societatis fundatoris & patroni, vicefimo.”

Mr. HOWARD presented for the repository a large stony substance, that was supposed to be earth petrified, which formerly filled up the shell of a nautilus.

Sir THEODORE DE VAUX presented some petrified substances, supposed to have been plants.

Dr. CHARLETON likewise presented two birds of the rarer kinds, called sitta and phœnicurus.

Mr. OLDENBURG produced a paper of Mr. HENRY PHILIPS's addressed to Dr. WALLIS, giving an account of his observations concerning the true time of the tides; which was read, and ordered to be entered in the Letter-Book*.

Mr. HOOKE being called upon to declare what apparatus he had thought upon for the experiments of diving, to be tried by the diver, who offered himself, said, that there were formerly made diving-boxes, which he would put in order; and that the experiment necessary to be made first of all for this purpose was to try, which way the diver could continue a good while under water, so as to work there freely; which being once contrived so as to succeed, there would then offer themselves a great number of experiments to be made under water.

Dr. CLARKE produced a paper containing a very particular account of the several ways of making alum; which was ordered to be copied* and compared with that formerly† given by Mr. COLWALL.

The experiments appointed for the next meeting were

1. Those of weighing metalline bodies.
2. The cyder-engine ordered to be perfected.
3. Optic-glasses, both of Mr. COCKS in Long-acre, and of Mr. HOOKE, for seeing in the dark.

April 13. At a meeting of the COUNCIL were present

* It does not appear there.

† It is extant præf. B. B. vol. &c.

‡ Aug. 21, 1661.

The President

The lord bishop of SALISBURY
 HENRY HOWARD of Norfolk
 Mr. CHARLES HOWARD
 Mr. AERSKINE
 Sir PAUL NEILE
 Sir ANTHONY MORGAN

Sir GEORGE ENT
 Dr. WILKINS
 Mr. HAYES
 Mr. COLWALL
 Mr. OLDENBURG.

The care of the conveyance of the ground given by Mr. HOWARD to build a college upon for the society was again recommended to Sir ANTHONY MORGAN, who promised now to employ himself about it.

It was ordered, that the treasurer issue out thirty pounds in part of payment of the bills brought in by the workmen, employed by the council of the society in making the house of Chelsea-college tenantable :

That the president be desired to signify to the society, that considering the want of experiments at their public meetings, the council had thought proper to appoint a present of a medal of at least the value of twenty shillings to be made to every fellow, not curator by office, for every experiment, which the president or vice-president shall have approved of; and that the president be likewise desired to advise with Mr. SLINGESBY about the imprints of such medals :

That the lord BERKLEY and the lord bishop of SALISBURY be desired to speak, as they should see occasion, in the house of peers to the bishops of the society for contributions to the college : And

That the president and HENRY HOWARD of Norfolk be desired to speak to the temporal lords of the society for the same purpose.

HENRY HOWARD of Norfolk accordingly took a list of several lords and gentlemen, in order to solicit their contributions for that purpose.

The president and Dr. WILKINS promised to meet together, in order to speak to Mr. MATTHEW WREN and Mr. WILLIAMSON for the like contributions ; and the president undertook to solicit Sir ROBERT PASTON and Sir CYRIL WYCHE for the same.

Mr. COLWALL subscribed one hundred pounds for the building of a college.

The council licensed Dr. WILKINS's book, intitled, *An Essay towards a real Character and philosophical Language*, and n^o 34 of the *Philosophical Transactions*.

It was ordered, that the amanuensis cause to be bound a book in folio with vellum leaves, to contain the names of the benefactors to the society, together with the particulars of their respective donations : And

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That

That Mr. HOOKE complete the printed list of the collection bestowed by Mr. COLWALL on the society; and that this list be inserted in the next edition of the *History of the Society*.

April 16. At a meeting of the SOCIETY,

Sir ERASMUS HARBY, bart. was proposed candidate by Sir PETER WYCHE.

Sir ROBERT SOUTHWELL presented to the society divers curiosities, to the number of thirty six, and several relations and answers to inquiries to the number of eleven; among the former of which was a very curious carpet wrought of the barks of trees in Angola. Some of the latter being written in the Portuguese language, viz. those concerning the Nile, the unicorn, the variety and uses of palm-trees, the weed of the Red-sea, which dies the Pintadoes, and the emperor of Abyssinia, Sir PETER WYCHE was desired to translate those papers into English, which he promised to do.

Mr. OLDENBURG produced a letter written to him by PAUL RYCAUT, esq; dated at Smyrna, November 23, 1667, containing answers to the queries concerning Turkey, recommended at his departure from England; which letter was read, and ordered to be inserted in the Letter-Book, and was as follows:

“ Worthy Sir,

“ **I** Have ever since my last return into Turkey greatly desired to satisfy you in the matter of those inquiries, you delivered me in England, in behalf of the Royal Society; but I was prevented at first by a dangerous sickness, contracted by contagion of the air, or the people; which seemed the more long and tedious to me, in regard it was the first violent distemper I ever knew, or ever interrupted the course of my health by a confinement to my bed.

“ But when I seriously considered, that this was the severest effect of mortality, that had fallen upon me, in the seven years I had been a sojourner in Constantinople, a climate subject to no diseases but the pestilence, and malignant fevers; (consumptions, gouts, stone, dropsies and scurvy, being rarely or never found there;) I did not so much repine, or wonder at my present sickness, as I blessed God, that the epidemical contagion had not seized me sooner, when my body was yet fresh, and unaccustomed to the temperature of that air.

“ For Constantinople hath been always greatly afflicted with the plague, especially in June, July, and August, more than any other part of the world, which is the reason, that Hippocrates, born in the island of Coos, prescribes to the Grecian emperors so many rules against the contagion in their imperial city. And now by reason of that principle of predestination, the contagion encreases amongst the Turks together with the heats, and no rules or remedies applied to

“ prevent it; by which means the pestilence is become so universal, that unless
 “ one dies of old age, or a violent death, the disease, if mortal, without further
 “ inquiry, is for the most part concluded to be pestilential.

“ The reason, that Constantinople is thus subject to the plague, is attributed
 “ to divers causes. Some say, that the multitude of slaves brought yearly by the
 “ Black-sea, and their hard diet, beget this corruption. Others say, that the
 “ commonalty being for the most part nourished in the summer time by cucumbers
 “ and melons, drinking water upon them, and using no helps to correct the cru-
 “ dities, fall into malignant and pestilential fevers. But most physicians there
 “ conclude, that the air of Constantinople is infected by the north-east winds,
 “ which blow commonly for three months, beginning about the summer-solstice,
 “ arising from unwholesome marshes in Moscow and Tartary, and passing over
 “ the Black-sea, a place known to abound with fogs and mists, do bring with
 “ them certain dispositions tending to corruption, which working upon bodies
 “ prepared already by bad diet (as said before) may well be judged to be the
 “ causes of this distemper.

“ I should also have been more ready, and speedy in my answers to the inqui-
 “ ries; but that much of my time hath been taken up in my late settlement in the
 “ consulate of Smyrna; so that if I am not so exact in my resolves, as were to be
 “ wished, you will be pleased to pardon me for the present, upon assurance, that
 “ I shall be more diligent for the future, especially in giving you an account of
 “ the antiquities and ruins of the six other churches of Asia, to which places from
 “ hence I design to journey, so soon as I am freed from the attendance on her
 “ excellency the countess of Winchelsea, who now honours my house with her
 “ presence, intending to embark speedily for England.

“ But that I may for the present resolve, as well as I can, your queries, I an-
 “ swer to the first.

“ 1. That, which you call rusma, called by the Turks chrusma, is employed to
 “ no other use, that I can hear of, than to take away hair. It was told me, when
 “ I first demanded, where that earth did arise, and from whence it was brought,
 “ that it came by way of the Black-sea from Mengrelia, and Chircassia: but I
 “ have learned now better, and understand, that it is a composition of lime, and
 “ auri pignentum, of which, according to your desire, I have sent you a small
 “ quantity by the hand of this bearer, who also will inform you the same.

“ 2. The use of opium is become now very common amongst the Turks; such,
 “ as in their youth were accustomed to wine, growing into years, leave it off, as
 “ being esteemed a greater disgrace of old age, and wine to be the vice of young
 “ men. But howsoever, not to lose altogether their kiese, as they call it, which
 “ is the pleasure of intoxication, they fall to eat opium, accustoming themselves to
 “ it by degrees, proceeding from scruples to drachms; the greatest quantity, I ever
 “ heard any man hath taken, is 5 drachms. I never remember to have heard,
 “ that it was ever given to camels, or dromedaries; but in Arabia it is common

“ to cure their horses by it of a griping in the guts, giving them a small quantity of it in water at the nose, mixed with bears gall. I have observed, that those men, who use it, become strangely sottish; for when the opium is digested, and hath done working, they seem to be void of all life, or foul, having a strange deadness, or stupefaction on their animal spirits: And when again they renew their dose (as they are forced to do often) they fly out either into a kind of phrensy, or into the wild actions of drunken persons.

“ 3. Mummies are certainly found in the sands of Arabia, that is, the flesh of men dried and hardened by the sun, and drinefs of the sands. But it is positively held in Egypt, that they have not the same virtue with those, which are embalmed.

“ 4. I am informed from some, who have lived at Damascus, that there is in that country a sort of tree, called by the Arabs mouze; it grows about nine or ten foot high, it is cut close by the root every year, and shoots up again; the leaves are about a foot long, and half as broad; it bears a yellow blossom, the fruit in the form of a cucumber, somewhat tart, and sourish to the taste.

“ 5. I cannot receive any information of the grapes without grain in the most southern parts of Arabia Felix. But we have here in Anatolia a small sort of wild grapes, black and very sweet without grains: also I have seen the like in Hungary, and on the confines of Bosnia, of which the people make a liquor; but the Turks give it not the name of wine, that so they may drink it without sin, or scandal, but call it hard ale, of which I have tasted myself, and observed, that though it seems to be a wine of little spirit, yet drank in a quantity it will inebriate. But I have thought it worthy your knowledge to acquaint you, that I have seen in these parts a sort of vine called by the Turks *yedi teren*, and by the Greeks *ἑπτα τέρην*, which signifies, that which brings forth seven times; it is so great a bearer, that they are forced to support the vine by posts in the form of an arbour, and I have seen at the same time grapes in the bud, green and ripe. I have sent Mr. CHARLES HOWARD some slips of it by this bearer.

“ 6. I have spoken with some, that have passed by mount Caucasus, but never over it, but being men, who travelled for necessity, they were able to render me a weak account of it, as to its position, or temper, more than that it is exceeding high, craggy, and horrid, casting a shadow a day's journey from it.

“ 7. The water runs out of the Euxine sea into the Propontis with a wonderful swiftness, which is the more admirable in regard of the depth of the Bosphorus, being in the channel fifty or fifty five fathom water, and along the land in most places, ships may lie ashore with their heads, and yet have twenty fathom water at their stems. Here are no tides to be observed, nor that the water either rises or falls above a foot or two at the most, nor could I ever learn certainly, which were the Euripi; I conjecture, they may be some rocks at the mouth of the Bosphorus, which have diversity of tides, according to the winds.

“ 8. I never did hear from any, who could inform me, that the Caspian sea doth empty itself into the Euxine by any passage whatsoever. I believe it only a conjecture of the virtuosi in Christendom, and perhaps not without reason: but the Turks and Greeks, who sail the Black-sea, are so incurious in such discoveries, or observations, that as yet they have not been able to draw so much as a sea-chart or map of the promontories, bays or cape-lands of the Euxine, much less able to give us light in so hidden a secret, as this.

“ 9. Constantinople is not now so subject to earthquakes, as reported in former times; there having not happened in the last seven years, in which I have been an inhabitant there, above one, of which I have been sensible: but within these last twenty days in Smyrna fell out an earthquake, which dangerously shook all the buildings, but did little or no harm; the ships in the road, and others at anchor above three leagues from hence, were sensible of it. It is reported here, that this city hath been devoured already seven times by earthquakes, and it is prophesied, that it shall be so again, so soon as the houses reach the old castle upon the top of the hill, on the side of which remain the ruins of the old city, and the tomb of St. POLYCARPUS, St. JOHN's disciple, still preserved by the Greeks in great veneration. The north-east winds at Constantinople for the most part bring a clear serene air, especially in the winter; the south winds bring a thick suffocating air, extremely offensive to the head, and the north-west constantly bring a storm, but never continuing above an hour at the most, by reason of the violence of it.

“ 10. I have observed, that the leather dressed in Turkey is nothing so strong and serviceable as that in England; a certain proof whereof we have in wearing. I know that it is commonly reported, that the leather in these parts, though thin and supple, will hold out water; but the truth hereof is, that in their boots, between the lining and the leather, they put a fear-cloth, which being curiously sewed in the seams, as they rarely work all things in leather, will hold out water, though you set them in it twenty four hours together. In cleansing of their leather they use lime and album græcum, and instead of bark of trees they use valonia, which is a sort of acorn growing on the oaks. I am persuaded, that our acorns in England would produce the like effect, and perhaps better; for many times the valonia burns the leather so much, as makes it little serviceable; so that it may be supposed, that our acorns having less heat to produce them, may be more temperate and serve the turn better.

“ 11. I have answered so fully to this inquiry in my book of the Ottoman empire, that I shall not need make any answer thereof in this place.

“ 12. The Turks are observed to be of so imperious a spirit in their families, that they seldom admit of pastimes, or recreations to their servants; and the masters themselves being commonly of a reserved sullen temper, given to sloth, and pride, entertain themselves with no pastime, unless with the discourses of their neighbours, who often visit the persons of greater note; or when they are pleased to retire themselves into the apartments of their women,
“ where

" where they admit of no disturbance on the most important occasions whatsoever.

" 13. Coffee is observed to work little effect, especially in those, that use it most; and yet because most Turks die with a pain in the stomach, many physicians attribute it to their excess in coffee, which drank in great quantity fouls and bakes in the pit or pylorus of the stomach. Often bathing makes both men and women to decay betimes. Shaving the head doth doubtless much refresh those, who use it: so that the Turks have no sorer the least heaviness, or ach in their heads, but they have recourse speedily to their barber for the cure.

" 14. I shall serve you what is possible in the information of works of antiquity in these parts; but they are so hardly found, being studiously destroyed by the Turks, in most places, where I come, nothing but confused ruins appearing; ancient inscriptions, that I have found in Greek, engraved in stones, being as it were purposely beaten out with hammers, and placed in walls of new building with the letters subverted; so that I fear I shall be able to render you but a lame account from hence in those particulars. Howsoever what occurs in my journey to the churches of Asia, worth your notice, I shall faithfully transmit to you after my return. The aqueducts near Constantinople, built by Solymán the Magnificent, I have often seen, and reviewed with great satisfaction, being the most stately of that kind I ever saw in any part of the world, though the measure of them, I must confess, I never was so curious as to take, and being at this distance now from thence, I conceive, that I shall never again have the opportunity to do it.

" The bearer hereof Signor PIETRO CESTI, a person, who hath been a great traveller, and rarely well versed in the Arabick and Turkish languages, I earnestly recommend to you; and that in regard his misfortunes have driven him to seek his bread in England, you would be pleased to afford him all civil courtesies, which you esteem due to a stranger and an ingenious person. And so, Sir, wishing you all happiness I remain,

" S I R,

" Your most assured humble Servant,

" PAUL RYCAUT."

Smyrna,
November 23, 1667.

Upon occasion of the account given in this letter of the way used in Turkey of dressing leather with acorns, Mr. Hooke was ordered to suggest the like trial to be made with the English acorns by the tanners of London.

The person, who brought this letter, called Signor PIETRO CESTI, born in Persia of Italian parents, being introduced into the society received their thanks for his care of the said letter, as also for the present of several curiosities of his own to the number of thirty six.

Mr.

Mr. Hooke produced again the large conical tin-receiver for the magnifying of sounds; which being tried was found to make words softly uttered at a distance to be heard distinctly; whereas they could not be so heard without this instrument.

He produced a muscle, to shew how it consists of mere fibres or strings lying close together, longwise, like the fibres of talc.

The experiments appointed for the next meeting were the same, which should have been made at this, but were not.

April 20. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
HENRY HOWARD of Norfolk
Sir GEORGE ENT
Dr. WILKINS

Mr. COLWALL
Mr. CREED
Mr. OLDENBURG.

The president moved, that for the more effectual getting in of the weekly contributions, letters might be written to all those, who were in arrears, not of the nobility, desiring them to attend the council at certain days to be nominated, and then to declare their resolutions concerning the payment of such arrears.

It was ordered hereupon, that Mr. OLDENBURG draw up a form of such letters against the next council.

It was resolved, that the president, the lord BERKLEY, the lord bishop of SALISBURY, HENRY HOWARD of NORFOLK, and Dr. WILKINS be desired to take all opportunities of soliciting subscriptions of the lords for building the college; and that the president do give notice the night before to the rest of this committee, when his lordship can attend that business.

It being suggested, that LEWIS DU MOULIN, M. D. was willing to translate *The History of the Royal Society* into Latin, and that it was necessary to hasten this translation, for fear it should be done in Holland, to the prejudice of the author; it was ordered, that Mr. OLDENBURG should be desired to speak to Mr. MARTYN, the society's printer, and to let him know, that the council approved of the said Dr. DU MOULIN, and that he, Mr. MARTYN, should do well to agree with the doctor about the recompence for his pains, and to pay the same.

April 23. ROBERT earl of AYLESBURY was proposed by Mr. OLDENBURG and elected.

Sir ERASMUS HARBY was elected.

THOMAS FLATMAN, esq; was proposed candidate by Mr. AUBREY.

The experiment to shew, that two metalline bodies weigh more in water, when mixed, than when weighed both together apart, was deferred, by reason that the beam of the balance was not well adjusted, nor a set of weights, accurately divided, ready; which were ordered to be provided against the next meeting.

Dr. HOLDER brought in an account of an experiment made by himself concerning a cause of deafness from the want of a due tension of the tympanum of the ear; which was read, and ordered to be registered *.

Mr. OLDENBURG produced a letter written to him by Dr. WALTER NEEDHAM, dated March 10, 1667, containing some animadversions upon Mr. HOOKE's deductions from the experiment formerly made by him of preserving animals alive by blowing through their lungs with bellows: which letter was read, and ordered to be entered in the Letter-Book †, and sent to Mr. HOOKE to consider it; and it was ordered, that Dr. LOWER should be desired to make the experiment mentioned in that letter relating to the matter in debate, and Dr. KING to assist in it.

This gave occasion to discourse of respiration; whereupon Mr. DANIEL COXE suggested, that it was proper to examine and separate the parts of the air, in order to know what there may be in it, that may make it so necessary for respiration. He being asked, whether himself had not done something in this particular, answered in the affirmative; and being desired to communicate it to the society, promised to do so, when he should have proceeded somewhat farther therein, and brought it to more maturity.

Mr. AUBREY produced some mineral water from Milford in Wiltshire, about 80 miles from London, which yet kept its strength so well, that when a little dust of galls was poured on it, and stirred with it, it was presently tinned into a dark red colour. The bottles containing this water were delivered to Dr. MERRET to examine it.

Mr. EVELYN presented a small box of shells found at the bottom of a chalk-pit about fifty feet deep near Brockley in Kent.

Mr. OLDENBURG produced several curiosities delivered to him from Signor PIETRO CESI, among which were some exotic seeds, and particularly of that papaver, whence opium is made. It was ordered, that some of each sort of these seeds should be delivered to Mr. CHARLES HOWARD, and that he be desired to make such trials with them, as he should think fit, and to give the society an account of the success; and that the rest of the seeds, together with the other particulars (being thirty two in number, according to the list delivered with them) be committed to Mr. HOOKE for the repository.

* Register, vol. iii. p. 351. It is printed in the Philos. Transact. vol. iii. n^o 35. p. 665. for May 1668.
† Vol. ii. p. 166.

The experiments appointed for the next meeting were the two above-mentioned, viz. of the weighing of metalline bodies, and of making Dr. NEEDHAM's experiment mentioned in his letter.

April 27. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY

The lord BRERETON

Mr. BOYLE

Sir PAUL NEILE

Sir GEORGE ENT

Dr. WILKINS

Mr. COLWALL

Mr. CREED

Mr. HOSKYNs.

Mr. BOYLE was sworn of the council.

It was ordered, that such of the fellows, as shall not pay their arrears due to the society within one month after the demand thereof, shall be ejected, according to statute:

That there shall be no standing salary allowed to either of the secretaries:

That a present be made to Mr. OLDENBURG of fifty pounds: and

That Mr. COLLINS be desired to assist in making a catalogue of the Arundelian library forthwith.

April 30. At a meeting of the SOCIETY,

Mr. FLATMAN was elected.

BENJAMIN WOODROFFE, M. A. was proposed candidate by Mr. BOYLE.

Mr. AUBREY acquainted the society with an observation made by him April 27, 1668, *hor.* 10. of a nubecula between cancer and caput hydræ; and he was desired to continue to observe this phenomenon, as he had opportunity; and the scheme of it brought in by him was ordered to be registered.

Mr. BOYLE being desired by the president to acquaint the society with some of the particulars, which he had entertained himself with during his late absence, mentioned, that he had, among other things, employed himself in the prosecution of the experiments concerning air, which perhaps he might be induced to publish, when finished, as an appendix to his former book upon that subject. And being requested to declare what heads of that argument he had chiefly pursued with experiments, he named these following; viz.

1. Experiments about different liquors, that contain air.
2. About the proportion of air latent in water and other liquors.

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2. About

3. About the effect of the absence of air in soft bodies.
4. About the effect of the absence of air upon living creatures.
5. About the generating *de novo* or extricating of air.
6. About the ways of examining, whether the substance thus generated or extricated be true air or not.

He being desired to communicate some of these experiments to the society, to be tried before them, promised to do so, and to produce some of his papers containing them at the next meeting; against which time Mr. Hooke was appointed to cause the rarefying-engine to be made ready, that then it might be produced, if there were occasion to make any of those experiments therein; as also to provide some vipers for that time.

Mr. Hooke read his answer to Dr. WALTER NEEDHAM's letter concerning the experiment of preserving a dog alive by the wind of bellows, and by keeping the lungs distended with fresh air, though not moved. It was ordered, that the experiment mentioned by the doctor seeming to him to disprove the consequence deduced by Mr. Hooke from his experiment, should be made at the next meeting, the curators and Dr. KING, appointed at the last meeting to make it at this, being absent; and that the operator should again speak to Dr. LOWER and Dr. KING to take care of the experiment at that time.

Mr. Hooke proposed an experiment, to see, whether the blood circulates, when the lungs are subsided. He was desired to make it before the society.

He remarked, that it had been observed, that blood, though of a dark blackish colour, would, when exposed to the air, become presently very florid, and that florid surface being taken off, and the subjacent part exposed again, would acquire the like floridness; and that therefore it might be worth the observing by experiment, whether the blood, when from the right ventricle of the heart it passes into the left, coming out of the lungs, it hath not that tincture of floridness, before it enters into the great artery; which if it should have, it would be an argument, that some mixture of air with the blood in the lungs might give that floridness.

SIR ROBERT HENSHAW presented by the hands of Mr. HENSHAW an East Indian serpentine-stone, called *pietra de coure*.

SIR THEODORE DE VAUX communicated a letter of Mr. JOSEPH WALSH, dated April 26, 1668, giving an account of a cinereous substance found at Kenchester-Walls, anciently a Roman station, called *Ariconium*, in Herefordshire: which letter was ordered to be inserted in the Letter-Book*, and SIR THEODORE desired to procure some of those cinders.

* It does not appear in that book.

The president took notice of a new book on mechanics, the author of which was Dr. WALLIS, then present, who was desired by the society to hasten its publication *.

The experiments appointed for the next meeting were those mentioned above, and that of weighing metalline bodies mixed and apart.

May 4. At a meeting of the COUNCIL were present

The President

HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Mr. AERSKINE
Sir PAUL NEILE
Sir ANTHONY MORGAN
Sir GEORGE ENT

Dr. WILKINS
Mr. COLWALL
Mr. HOSKYNES
Mr. CREED
Mr. OLDENBURG.

It was ordered, that the president, Sir PAUL NEILE, and Sir ANTHONY MORGAN be desired to speak with the lord privy-seal, to satisfy his lordship, that the restraining the society from the power of alienating what his Majesty had given them in the grant of Chelsea-college, was ineffectual: and

That the president, Mr. HENRY HOWARD, and Dr. WILKINS, be desired to meet on the Wednesday following in the morning in Westminster-Hall, to solicit the members of the society, who were of the parliament, for contributions.

The president moved, that the building of the society's college might be begun forthwith, there being already above one thousand pounds subscribed. In order to which Sir ANTHONY MORGAN was desired, that the deed of the conveyance of the ground might be expedited: which Sir ANTHONY promised should be done, as soon as the ground should be surveyed, to know the bounds allotted for the said building.

Dr. WILKINS was desired to procure at the next meeting of the council Dr. WREN's draught of the building.

May 7. At a meeting of the SOCIETY,

Sir ERASMUS HARRY was admitted.

Mr. WOODROOFFE was elected and admitted.

JOHN COLWALL, esq; was proposed candidate by Dr. WILKINS.

* It was published at London 1670 in 4to.

Mr. BOYLE, at the desire of the society expressed at the last meeting, produced some of his papers, containing certain experiments tried in his rarefying-engine upon vipers and frogs; which being read and approved, the society desired the satisfaction of seeing some of these experiments made: whereupon it was ordered, as before, that the engine should be brought to Arundel-house, and vipers provided by the operator; and that the slow-worm produced at this meeting should be brought again at the next, first to be put in the engine, and then to bite a young dog or kitten, to which afterwards the stone, called *pietra di covre*, lately presented by Sir ROBERT SOUTHWELL, should be applied, to see its effect upon the wound.

Mr. BOYLE presented the society with a gage, proper for seeing how far a receiver is exhausted of air, and whether it keeps it such; which is particularly proper in long pipes, wherein no other gage will enter.

Mr. OLDENBURG produced two letters sent him from Aleppo from the English consul, Mr. BENJAMIN LANNOY, and THOMAS HARPUR, M. D. dated Aug. 5, 1667, containing an answer to the inquiries for Turkey, formerly recommended to Sir ANDREW RICCARD, and by him sent to Aleppo: which letters were read, and ordered to be entered in the Letter-Book*. Mr. LANNOY in his letter to Mr. OLDENBURG mentioned, that he had sent the inquiries of Persia to the English agent at Ispahan, and had recommended those for Turkey to his physician Dr. HARPUR. Mr. LANNOY's answer was as follows:

" Sir,

Aleppo, August 5, 1667.

" I Lately received from my honoured friend, the worshipful NICHOLAS PENNYNG, a paper of inquiries, which you delivered him to send to me. Sir, I recommended the inquiries to my physician, Dr. HARPUR, who hath done his endeavour to answer your desires, which I send you here inclosed. I have sent the paper to the English agent at Ispahan, and have requested him, as you desired; whose answer, so soon as I receive it, shall be sent to you, and if I may be further serviceable, I shall account it an honour to receive your commands, and shall remain,

" Sir,

" your most humble servant,

" BENJAMIN LANNOY."

" Clarissime vir,

" EPISTOLAM tuam accepit consul noster BENJAMIN LANNOY, rogatus à te, ut de veritate nonnullorum phenomenorum te certiores faceret: ipse publicis domesticisque distractus negotiis hanc mihi provinciam delegavit, quam subentissimo animo accepi, licet tanto oneri impar. Cæterum nihil mihi optabilius accidere poterat, quàm ut in aliqua re illi societati possem inservire, quam totus literatorum orbis admiratur, vestra vestigia exemplaque jamjam sequutu-

* Vol. ii. p. 43.

"rus; imo sperat ipsa philosophia, se tandem aliquando, vobis facem præferentibus, ex antiquis densisque tenebris in lucem emerfuram. Quid vestra in philosophando methodo clarius? quid ad exactam rerum cognitionem *avarelyis* et sensatione aptius? cum apud omnes in confesso sit, nihil esse in intellectu, quod non fuerit prius in sensu. Ego quidem pro viribus enitar, ut, siquid observatione in triplici regno dignum hic occurrerit, id vobis per me in posterum innotescat. Sed tria præsertim meis conatibus officere videntur. Primum est, quod paucis abhinc mensibus ex Italia huc accessi, adeo ut quæ vobis scribo, ab aliis, fide tamen dignis, confirmata sint. Secundum, quod indigenarum alii, lucro tantum et voluptatibus dediti, alii dura oppressi servitute, literis incumbere, resve naturales perferutari nec curent nec audeant: parum igitur vel nihil auxilii ab illis expectandum. At Europæi et advenæ mercaturam faciunt. Terrium, quod mihi praxim medicam exercenti vix tempus sufficit, ut aliis negotiis vacare possim. Sed, cum societatis vestræ, vel potius ipsius scientiæ res agatur, clarissime vir, nihil intentatum relinquam, ut ex parte saltem officio vestrisque votis satisfecisse videar. Hunc igitur conatum meum, qualiscunque sit, in bonam partem accipe, & in posterum, si placuerit, tuis literis mandarisque fac ut me honores. Vive diu et vale, vestrisque faveat cunctis ipse sapientiæ fons et largitor.

"*Responsiones ipse sequuntur.*

"Quæritur primò, qualis sit hic aeris temperies &c.? Optima profectò est, et quæ corpora ad prosperam magis quam adversam valetudinem disponat. Calidior tamen solet, ni perpetuò in hac regione à mense Maio ad Augustum usque et ultra flarent Zephyri, adeo ut dum nunc hora quasi meridiana, et ardente sirio, hæc scribo, multò minus caloris, quam olim in Italia, perferentiam: sed audio, rem non ita semper se habere singulis annis. Uno verbo, cælum hic ita purum et tenue est, ut toto ætatis tempore nec pluviz nec nubes unquam ferè conspiciantur.

"Quæritur 2^a. quibus morbis hæc regio præsertim subiaceat? et quidem, quantum vel propriâ experientiâ vel aliorum narratione comprehendere hætenus potui, parum vel nihil à morbis Europæ endemiis, uno aut altero excepto, differunt. Frequentiores sunt hic dysenteriz et apoplexia; quod postremum à nimio Venereis et opii usu proficisci videtur. Febrim typus idem ut apud nos; duo tamen notata digna; 1^a est, quod in febribus acutis sapor frigidus salutem, calidus mortem ut plurimum portendat. At HIPPOCRATES aph. 4^o libro aph. 37^o contrarium pronuntiavit. Alterum est, quod in iisdem acutis nec pulsus intermittens periculum denuntiet. Lues Venerea rarior quam in Europa; non desunt tamen, qui hoc foedissimo morbo tentantur. Lepra seu elephantiasis, olim his regionibus familiare malum, vix nunc reperitur; audio tamen Damasci nosocomium huic morbo obnoxii destinatum esse. Porro superest, ut de malo Aleppino aliquid addam, sic enim ab Europæis *κατ' ἰξον* nuncupatur *Il mal d'Aleppo*; estque huic regioni usque ad urbem Bagdad proprium, et familiare; omni ætati, sexui, advenis, indigenisve commune. Apparet in cute pustula parva, dura, rubicunda, cujus cacumem vix acus cuspidem in principio magnitudine

"tudine excedit; hæc postea grandior facta, quinque vel sex radicibus seu fibris innixa, per totos sex menses ad *أشخان* ascendit, perque alios sex menses ad declinationem pervenit, adeo ut totius morbi decursus ut plurimum unius anni spatio comprehendatur; unde etiam ab Arabibus *malum unius anni* nuncupatur: Sed hæc pustula neque in principio, nec in statu, nec in declinatione medicamentis cedit, quin potius iisdem, veluti cancer, irritatur, etiamsi anodyna essent; sed si totum negotium naturæ committitur, nullus dolor vel molestia perferitur: et hic morbus non semel, sed pluries, variis eodem tempore corporis partes invadere potest; et si faciem occupet, ut sæpe accidit, insignem inducit cicatricem, quæ postea sensim evanescit. Calculus et podagra non ita, ut apud nos, frequentia, quod à rariore vini, frequentiore balnei usu, procedere videtur. Hæc sunt quæ ad morbos spectant.

"Quæritur tertio, *quales sint aëris calique varietates secundum diversa anni et diæ tempora*? Ver temperantium fulgura, tonitrua, et pluvie concomitantur, quæ æstate desinunt, redeuntque postea sub finem Augusti; sed hiberno tempore irrigus penetrans et acutum corpora per duos menses (Decembrem et Januarium) exercet, adeo ut plurimi hic tunc pellibus vestiuntur. De variis dici temporibus nihil habeo quod dicam. Quod ad 4^{um} quæsitum attinet, *an felicitas in Aleppo, ut in Ægypto, circa mediam æstatem abeat pestilentia*? distinguendum est, et ita res intelligenda, quod revera sub festum D. MAGDALENÆ pauci vel nulli ferè amplius moriantur; et quos deinde pestis invadit, ut plurimum non opprimit; remanent tamen et bubones et anthraces, sed, ut jam dixi, non ita ut antea lethales. Idem forsitan de Ægypto dici possit.

"5°. De meteororum generatione, speciebus, statisque temporibus, de mineralibus, animalibus, soli natura, ventis, montibus, eorumque situ, ac de aquis thermalibus, lacubus, fluviisque ita rem se habere intellexi: Et primo de fluviis, Cinga fluvius (si tamen tale mereatur nomen) Aleppo præterfluit; Orontes, Antiochiam. Sed præter hæc duo sunt et alia flumina, Ephrim, Euphrates, Chobar, juxta Orpham (olim Nisibin, post Romanorum tempora, Edesse et Charre) Abana et Pharphar, Damasco proxima. Cinga, Euphrates, Abana et Pharphar versus Aquelonam et Austrum tendunt. Lacus 12. abhinc milliariibus Cingam, alterque, totidem à Damasco distans, Abanam et Pharphar, recipiunt: in Sinum Persicum fluit Euphrates. Orontes ab Euro-austro ad Euro-aquilonem sub ipso Antilibano, non multum abhinc. originem ducens, postea ad Seleuciam, Hieria olim, nunc Sudine dictam, decem iuxta Antiochiam milliariibus in mare devolvitur; de fluvio Chobar nihil habeo quod dicam. Ephrim in Syria Cyrestica ortus, et prope radices civitatis Choros præterlabens ab oriente in occasum tandem in Orontem desinit: hæc de fluviis. Nunc de lacubus; inter quos primum locum tenet ipsum Orontis caput, 12. circiter milliaria amplexens. 2°. Lacus Antiochenus, in ipsa Antiochena valle, ubi olim DARIUS equorum greges alebat, 15. 16. ve milliaria ambiens, et propter incredibilem anguillarum proventum percelebris. Est et 3°, Hadder dictus, in quem Cinga nostra sese exonerat. 4°, Valde celebris viginti abhinc milliariibus Euro-Austrum versus diffusus, vocaturque à nostris *The Valley of Salt*.

" Hiberno enim tempore lacus est, ut æstivo nihil aquæ, sed ingens salis moles
 " apparet: parum abhinc DAVID cum HADERREZAR, SELIMUS cum CAMPHONE
 " GAURO pugnaverunt. In valle Antiochena sex septemve reperiuntur Therna-
 " lium aquarum fontes, qui sulphur redolent, argentumque croceo tingunt calore.
 " Unus ex istis ad varia morborum genera ab incolis laudatur. Prope *Choren*
 " audio aquam inveniri, quæ pannum, ut olim murex Tyrius, purpureo colore
 " inficit. Inter has aquas, quæ nivi liquefactæ permixtæ à montium jugis præci-
 " pitantur, aliæ alvum laxant, dysenteriaque generant, ut Albana et Pharphar,
 " aliæ salubres, gratæque palato, turbidæ tamen, quæ post breve tempus claræ
 " evadunt. Prope Bylan, septem à Scanderoon milliaribus, duo tresve reperiuntur
 " fontes, quorum aqua gravissima est, clara tamen, naturamque cupri referens,
 " aded ut bibentibus molestiam sensumque ponderis in ventriculo procreet, cujus
 " causa est, quod omnes hi montes, per quos hæc aqua percolatur, ferro cupro-
 " que abundant. Nunc hæc pauca de montibus: primusque occurrit mons
 " *Amanus*, super alios à tergo Scanderoon eminens, qui inde continuo quasi tractu
 " Ierosolymam usque, immo et ad montem Cassium in Ægypto prope maris
 " littora porrigitur: in hoc tractu sunt et alii montes Calbei, Libanus, Antiliba-
 " nus, Cassius prope Antiochiam, quia est et alius Cassius, ut jam dictum in
 " Ægypto. Hi omnes septentrionem et Austrum præcipue spectant.

" De mineralium venis nihil certi, quia, dum princeps has negligit, subditi ten-
 " tate non audent. Juxta Bylan montemque Amanum cuprum ferrumque repe-
 " ritur; qualis autem harum venarum situs ac positus, nescimus, deterret enim
 " investigandi periculum.

" Ventus, ut jam dictum est, à mense Maio ad Augustum usque et ultra sem-
 " per occidentalis, frigidus, salubrisque, ac omnium animalium in hac regione
 " salus et vita: aliquando à septentrione, cum insigni frigore, propter vicinitatem
 " cum monte Tauro, in Cilicia nivibus operto; aliquando ab oriente, cum
 " ingenti æstu, ob arenosum proximum desertum; raro ab austro perflat. De
 " tonitu et fulgure jam dixi, quæ, dum autumno et vere pluit, sunt frequentia;
 " nivis pauca, grandinis minor quantitas, utraque ad breve tempus permanent.

" Natura soli varia, hic pinguis, illic arenæ et calci permixta. Vix ullum ab
 " arte in agricultura auxilium. Subditi enim, dum in servitute vivunt, futuros
 " negligunt vel ignorant heredes.

" Triticum hordeique ingens proventus; in valle Antiochena oryza; nullibi quod
 " sciam, fecale nascitur. Ditiore tamen multo est in omni frumenti specie Italia,
 " quàm hæc regio, multisque plantis ac herbis, nobis familiaribus, caret.

" Quod ad fructus pertinet, ficus præcox, malus Persica, mora, melones,
 " Anguriae seu Citrulli, et uvæ in magna quantitate reperiuntur; pruna et cerasa,
 " pyra pomaque nostratibus minora deteriora ac rariora sunt: hicque delectus ab
 " agricolæ potius negligentia et incuria, quàm à soli sterilitate dependet.

" Nutrit

“ Nutrit camelos, bubulos, mulos, asinos, equosque generosos, & innumeros
 “ gazel seu antilopum greges: in montibus non defunt urli, lupi, tigres, jackales
 “ (mixtum inter vulpem et canem verocissimum animal) hiltrices &c. quibus
 “ Anglia caret; capris, ovibus ac bobus abundat. Serpentum sat magnus hic
 “ numerus, in valle Antiochena quasi infinitus. Viperis, credo, quod careat.
 “ Inter infecta unum est memorabile, medii digiti crassitiem et longitudinem su-
 “ perans, 44. hinc inde suffultum pedibus, unde ab incolis *orba orbain*, quod 44.
 “ sonat, nuncupatur; horridum aspectu animalculum, et denticulis duobus, vene-
 “ nosisque hominibus infectum. In Italia, quod sciam, non reperitur, estque ut
 “ plurimum ædium veterumque ædificiorum incola. Terræ motus hic rari, con-
 “ tinguntque ut plurimum autumnis, cum summa aeris tranquillitate; ad brevissi-
 “ mum durant tempus, aliquando tamen sat violenti; unde et ædes et arbores
 “ manifeste contremiscunt, et tunc Turcæ ad preces proni devolvuntur.

“ Secretum tingendi seu durius reddendi ferrum Damasci perit; est tamen unus
 “ hic, qui, oblata pecuniâ, hanc artem se docere velle proficitur. Quod ad rusina
 “ pertinet, non est nativum, sed ex calcis vivæ partibus quatuor, et auripigmenti
 “ parte una componitur; nec ad alios usus apud Turcas, quam pro psilothro
 “ usurpatur. Hujus sat magnam massam in Angliam, jussu vestre societatis,
 “ misit D. HARTOPPE, quod in causâ fuit, ut nihil ad vos transmissim.

“ And now, Sir, give me leave to write two lines to you in my mother-tongue,
 “ in which I had answered your questions, but that I thought the Latin more
 “ proper and expressive for that subject; and to entreat you to honour me here
 “ with your commands; as also, that whensoever your illustrious and excellent
 “ wits produce any new fruits of their learning, as, I hear, they daily do, to let
 “ me have a taste of them. You may imagine, how pleasant they will be in
 “ Syria. So I remain,

“ Sir,

“ your most humble servant,

THOMAS HARPUR.”

Mr. HOSKINS and Mr. HOOKE were desired to consider against the next
 meeting of some farther particular queries for Turkey to be sent thither by the
 next opportunity.

Some members suggested the following queries for Aleppo:

1. What figured stones have been cast up in those parts by earthquakes?
2. Whether Mount Sinai is known to have ever been a vulcano? and whether
 there be any vulcano's in those parts?
3. Whether Aleppo be so much subject to shaking palsies, as some report?
4. Whether the scimitars were not made in Persia?
5. Whether

5. Whether the person, who in Dr. HARPUR's letter is said to pretend to have the old way of hardening steel, may not be prevailed with to teach it? and what reward he demands for it?

6. To desire, that the odd insect mentioned in that letter may be sent over; and to suggest, that it may be conveniently done by putting it in rectified spirit of wine; and, in case that could not be had, in good brandy?

7. Whether the *mare mortuum* hath any vent?

Mr. OLDENBURG produced an experiment sent him from Paris, shewing, that when the picture of an object falls just upon the optic-nerve, there is no vision. The experiment itself was made and succeeded. Mr. OLDENBURG was desired to translate the French discourse upon it into English against the next meeting.

The experiment suggested by Dr. WALTER NEEDHAM in his letter of March 10, 1664, to prove, that an animal died rather for want of the blood's motion, than for want of a supply of fresh air, was ordered to be tried first in private by Dr. KING and Mr. HOOK, who agreed to meet for that purpose on Saturday morning following, and to give an account of the success thereof at the next meeting.

It was likewise ordered, that the experiments of weighing metalline bodies both apart and mixed should be presented.

Dr. WILKINS presented the society with his book, intitled, *An Essay towards a real Character and a Philosophical Language*.*

May 11. At a meeting of the COUNCIL were present

The President

Mr. BOYLE
Mr. AERSKINE
Sir PAUL NEILE
Dr. WILKINS

Mr. HOSKYNs
Mr. CREED
Mr. OLDENBURG.

Mr. HOSKYNs was desired to confer with Sir ANTHONY MORGAN for drawing up the reasons, whereby it may appear, that the clause suggested by the lord privy-seal, for restraining the society from alienating Chelsea-college, will not be good in law; and that the inserting of such a clause would only put the society to new charges, as the additional patent was already ingrossed: and that this paper be drawn up against the next meeting of the council intended to be summoned for the Monday following, and that it be given to the lord ASHLEY by the president and Sir PAUL NEILE to discourse the business with the lord privy-seal.

* Printed at London 1668, in fol.

Mr. HOOKE was desired to bring in his draught for the building of the college, and an estimate of the charges thereof, on the Monday following.

Sir PAUL NEILE was desired, that in case he should see Dr. WREN between that time and the Monday following, he would endeavour to engage him to attend the council at their next meeting, and to bring with him his draught for the said building.

May 14. At a meeting of the SOCIETY,

Mr. JOHN COLWALL was elected.

Dr. KING brought in his account of the experiment ordered to be made by himself and Mr. HOOKE in private, of filling the lungs of a dog with air, and keeping the same air without any admission of fresh air: which account was ordered to be registered^d, as follows:

“ May 9, 1668, in order to your commands, we made the experiment of filling a dog's lungs full of air, and keeping the same air without any admission of fresh air, in this manner.

“ First having placed and tied the dog in a convenient posture, and being furnished with a large bladder, that had a short brass tube fastened to it, we filled the bladder with air by the help of a pair of bellows, (the air being kept in by two ligatures, one at each end of the bladder;) then we cut off the aspera arteria, as near as we could conveniently to the epiglottis, and held it out by a thread: then we inserted our brass-pipe into the aspera arteria, and tied it very fast in; which done, we immediately slipped the running-knot from about the bladder, that the air might have a free passage from thence into the lungs, which we presently perceived was sucked into the lungs by the elevation of the dog's thorax, and its return, upon contraction of the thorax, into the bladder again: but when the thorax was dilated, we compressed the bladder, that we might fill the lungs with as much air, as they were capable to hold, by such a force. In the mean time, the dog made the same endeavours for breathing with the same motions, as is usual; though with more difficulty and violence, (as to the force of contraction;) for I could not continue my hands many minutes compressing the bladder, the air pressing so forcibly into it. After about three or four minutes, the dog began to struggle violently, and to repeat his endeavours for breath very frequently, with a nimble motion of the heart, but no convulsions; yet, after about six minutes, his strength failed apace; his motions of the breast and belly were less frequent; his pulse languid and slow, but equal enough; and then he began to be convulsed; and at the end of about eight minutes, we could see no signs of life (though unbound) only now and then a feeble pulse: then concluding him very near death or just suffocated, we immediately slipped the other knot, and made room for the bellows to play again, to fill the lungs with fresh air, (cutting a little hole in the bladder to let out the air, that had

^d Register, vol. iii. p. 297.

“ been.

"been so long imprisoned in the dog's lungs and the bladder) and within less than a minute, the dog, by our moving the thorax first and continual blowing, recovered motion in his breast, and his pulse did rise strongly, he opened his eyes, and, in a little time more, got strength again, and breathed freely: so then we sewed up his throat, leaving the mouth of the aspera arteria open, and set him down, and he walked away. Then we untied his mouth, and he presently fell to licking of himself, as not much concerned: but we all concluded, that if we had stayed but one minute more, before we let in fresh air, in all probability the dog's life would have been quite lost."

Dr. KING and Mr. HOOKE were desired to repeat this experiment, and then let the dog lie two or three minutes longer, when they should judge him as much dead, as they did at this time, that so the trial might be beyond exception.

Mr. HOOKE made an experiment of statics, to shew the penetration of liquors: first, there was a ball of glass poised in the air, and then it weighed three hundred and two grains and a half: the same ball in fair water weighed one hundred and fifty grains and seven eight parts: in oil of vitriol twenty four grains: in a mixture of an equal quantity of oil of vitriol and fair water seventy three grains and a half. It was ordered, that a full account of this be brought in by Mr. HOOKE.

It was moved by Mr. BOYLE, that a mixture might be made of oil of anniseed's and salad oil; as also of vitriol and rectified spirit of wine, and of mercury and aqua fortis: and he mentioning, that he had formerly made divers experiments of this nature, was desired to communicate some of them to the society, which he promised to do.

The dedication of Dr. WILKINS's *Essay towards a real character and a philosophical language* being read, it was moved by the president, that a committee might be nominated to examine and consider of that book, and make a report of it to the society; and accordingly the following persons were named, viz.

The lord bishop of SALISBURY
The lord BRERETON
Mr. BOYLE
Mr. AERSKINE
Dr. WALLIS
Dr. HOLDER
Dr. CHRISTOPHER WREN
Mr. WILLIAM NEILE

Dr. MERRET
Mr. HENSHAW
Mr. BALLE
Mr. WRAY
Mr. HOSKYNs
Dr. POPE
Mr. HAAK
Mr. HOOKE,

or any three or more of them, to be a committee for the purpose above-mentioned, and to meet at times and places, as they should think convenient.

The rarefying-engine being called for to try the experiment appointed at the last meeting to be made in it, but found not to have been brought, the operator was strictly charged to bring it in at the next meeting, and to fit it so as to make it

flanch for the experiments to be tried in it; as also to provide a slow-worm or viper to make trial upon.

Mr. HOSKYNs being asked, whether he had prepared his queries for Aleppo, produced some, which were delivered to Mr. OLDENBURG to be sent by him accordingly.

May 18. At a meeting of the COUNCIL were present

The President

HENRY HOWARD of Norfolk

Mr. CHARLES HOWARD

Mr. BOYLE

Mr. AERSKINE

Mr. COLWALL

Mr. HOSKYNs

Mr. OLDENBURG.

Mr. HOSKYNs was desired to speak to Sir ANTHONY MORGAN to make a draught of the conveyance of Mr. HOWARD's ground for building a college against the next meeting of the next council; and to speak to Sir ANTHONY about an attorney, who might appear for the defence of the society's possession of Chelsea-college.

Mr. HOSKYNs produced and delivered to the president the memorial for persuading the lord privy-seal of the ineffectualness of adding a clause against alienating Chelsea-college.

Mr. HOOKE was desired to bring in at the next meeting of the council an account of the number of books of the Arundel-library, and to meet with Dr. BALLE on the Saturday following for the completing of the catalogue of that library.

The dimensions for the great meeting room of the college were proposed to be twenty eight feet broad, forty two feet long, and twenty five feet high.

May 21. At a meeting of the SOCIETY,

Mr. JOHN COLWALL was admitted.

He presented the society, in a paper signed by him, with eighty pounds towards the building of a college.

Col. THOMAS COLLEPEYR was proposed candidate by the honourable HENRY HOWARD of Norfolk.

Mr. HOOKE brought in his account of the statical experiment of the penetration of liquors made at the preceding meeting; which was ordered to be registered*, as follows:

“ This experiment was made with a very good pair of scales, which would

* Register, vol. iii. p. 304.

“ turn

" turn with a small part of a grain, though the difference of weight was sensible
 " enough to be discovered by a more gross and unaccurate beam. The manner
 " of the experiment was this: there was taken a small ball of glass, somewhat
 " bigger than an inch in diameter; this was made heavy enough, by white lead
 " put within it and sealed up, to sink in strong oil of vitriol. This was suspended
 " by a very fine wire, under one of the scales, and the weight of it exactly taken
 " in the open air, which was found to be $302\frac{1}{2}$ grains. After this, a glass of fair
 " water was put underneath it, and the ball suffered to sink into it, and being
 " again exactly counterpoised, whilst in this medium, it was found to weigh $150\frac{1}{2}$
 " grains. Then the water was removed, and, instead thereof, a glass of oil of
 " vitriol was underplaced, in order to examine the gravity of the former ball in
 " this liquor, and it was found to be 24 grains. Then taking an equal quantity of
 " oil of vitriol and fair water, they were by degrees put together, which working
 " upon each other, caused a very great heat, till both of them were incorporated
 " and perfectly united into one liquor: then, being suffered to cool, they were
 " put into one of the former glasses, and set under the end of the scale, and the
 " same ball was suffered to sink into it, and was then exactly counterpoised, and
 " found to weigh $73\frac{1}{2}$ grains; whence the proportion of the weights of the water,
 " oil of vitriol, and mixture were as $151\frac{1}{2} : 278\frac{1}{2} : 229$: Which is a certain experi-
 " ment, that liquors are porous, and that they can penetrate each other, so that
 " both of them put together take up a much less room, than when separate; for
 " whereas, according to the former experiments, it ought only to have weighed
 " $215\frac{1}{2}$ grains, if there had been no incorporating of these two liquors, it was
 " now found to weigh $137\frac{1}{2}$ grains heavier in specie, than it would have done, if
 " there had been no penetration. This kind of experiments may be of great use,
 " and afford an excellent clue to lead one further into the recesses of nature, and
 " to inform us of the internal texture and component parts of bodies: For the
 " prosecuting of which enquiry, it were very good to examine the weight of sever-
 " al sorts of liquors, both mingled and apart; to examine the weight of
 " liquors, both before they have dissolved metals, stones, juices of seeds,
 " plants, &c. and when they are impregnated with the newly mentioned sub-
 " stances, and by some other liquors, whose comparative gravity has been also
 " examined, to precipitate those dissolved substances; and to examine the weight
 " of that compounded liquor that remains. For by such examinations, great
 " light may be obtained for the finding out the nature of dissolving and precipi-
 " tating liquors, and other liquors, that penetrate each other."

Mr. BOYLE proposed an experiment of glutting aqua fortis with as much mer-
 cury, as it would take in, without making it shoot; and it was ordered to be
 made at the next meeting.

The president moved, that a trial might be made of mixing salt with water, to
 see how much it would be heavier, when incorporated with water, than the two
 substances apart. Mr. HOOKE finding a difficulty of weighing salt in water, Mr.
 BOYLE suggested a way of performing it by weighing salt in rectified oil of tur-
 pentine; and by knowing the difference between the weight of the two liquors,
 oil of turpentine and water, will be known how much that salt weighs in water.
 This was ordered to be tried.

Mr.

Mr. BOYLE mentioned, that he had weighed sublimate, and finding how much mercury and how much salt there was in it, he thereby knew how good the sublimate was.

He took notice likewise, that he had made ready a baroscope for Aleppo, which he would bring in at the next meeting.

Mr. OLDENBURG read a Latin letter written to him from Venice by Signor FRANCESCO TRAVAGINO, dated May 1, 1668, N. S. giving an account of his progress in his new system of experimental philosophy; and declaring, that if the society should think fit to name to him any phenomena of nature for rendering the causes of them, he would undertake to perform it.

It was ordered hereupon, that this letter should be entered in the Letter-Book^f, and the writer thanked for his respect to the society; but as for particularising of effects to be explained, it was thought proper, that the secretary, as from himself, should mention to that philosopher some effects; upon which the secretary intimated, that perhaps he might name gravity, magnetism, the elasticity of bodies, and the rising of water in small tubes open at both ends^g.

The experiment made at this meeting was another statical one with aqua fortis and iron. Mr. HOOKE coming late, the experiment, which required much time, could not be finished, and therefore was referred to the next meeting.

Mr. COLLINS produced a paper containing a receipt for making a varnish of gum lac, which was ordered to be entered^h.

May 28. Col. COLLEPEPYR was elected.

Sir THEODORE DE VAUX subscribed twenty five pounds for his contribution to the building of the society's college.

The president produced an Italian letter written to himself as president of the society by the Prince and Cardinal LEOPOLD DE MEDICIS, dated at Rome May 5, 1668, N. S. in answer to the letter written to him in the name of the society, March 26, 1668, acknowledging the favour of his eminence's present of the Florentine experiments. The cardinal's letter was read and ordered to be entered in the Letter-Bookⁱ, and the favour and respect to the society expressed in it to be acknowledged on a proper occasion.

Mr. OLDENBURG communicated a Latin letter to him from Amsterdam by JOHN AMOS COMENIUS, dated 17 May, 1668, N. S. accompanying a present to the society of his book, intitled, *Via Lucis vestigata & vestiganda*: Which letter was

^f Vol. ii. p. 193.

^g Mr. OLDENBURG's answer to Signor TRAVAGINO was dated 10 June, 1668. Ibid. p. 223.

^h It does not appear in the Register-Book.

ⁱ Vol. ii. p. 201.

read,

read, and ordered to be entered into the Letter-Book^a, and the secretary was desired to return the society's thanks to the writer.

Mr. BOYLE brought in his travelling or portable baroscope invented by himself, to compare by the help thereof the weight of the atmosphere at the same time, not only in different parts of the same countries, but likewise in different regions of the world: Which was thus contrived, that the vessel containing both the sustained and the stagnant mercury was all of one piece of glass, of a like bigness, and placed, when filled, in such a frame, as might be easy to be transported with safety to the glass, and without its being liable to be easily broken by the violent motion of the quicksilver contained in it. He offered to direct the operator how to fill it, who was ordered thereupon to attend Mr. BOYLE for that purpose, that he might be able forthwith to prepare some instruments of this kind to be sent into several parts of the world. Mr. BOYLE suggested, that this instrument might be made use of at sea in great calms, and when the seamen go on shore any where, for the observing of the state of the atmosphere of such countries, as they shall come into.

Dr. KING acquainted the society, that he with Mr. HOOKE had repeated the experiment appointed to try, what time a dog would live without fresh air, observing the direction given at the last meeting about it; and that it had killed the dog; as also that he had tried another anatomical experiment in private, of both which, at the society's desire, he promised to bring in a written account at the next meeting.

Mr. BOYLE suggested, that it were not amiss to try, whether air might not be made fit for the respiration of animals; and intimating, that himself had made some trials of this nature, and committed them to writing, he was desired to communicate his notes, which he promised to do.

Mr. OLDENBURG produced a proposition made in writing by PETER DU MOULIN, D. D. prebendary of Canterbury, dated in that city May 23, 1668, about reforming the year. It was read, and recommended to the consideration of the astronomical committee; and the doctor's letter was ordered to be entered in the Letter-Book¹.

The experiment ordered at the last meeting concerning the dilatation of bodies with aqua fortis glutted with mercury, was tried. The weight of the aqua fortis employed was three ounces and three quarters, with which was mixed half that weight of mercury. The weight of the glass ball in the air was five drachms and seven grains; and of the same ball in the aqua fortis alone was an hundred grains; and of the same in the mixture twelve grains. Mr. HOOKE was ordered to bring in at the next meeting a full account of this experiment in writing.

^a Vol. ii. p. 202.

¹ It does not appear there.

Mr.

Mr. HOOKE was ordered likewise to try in private the experiment of the fluidity of the blood, when passed from the right ventricle of the heart through the lungs into the left ventricle; and Dr. KING was desired to join with him in it.

Mr. OLDENBURG communicated a letter to him from Dr. BEAL of May 23, 1668^a, containing observations made near Bristol by Captain SAMUEL STURMY about the variation of the needle, that there June 13, 1666, it declined westerly, 1 deg. 27 min. and June 13, 1667, about 6 minutes more; as also that at the same place and time the captain intended to make the like observations in the same company, in which he had made the former, wishing, that the like might be done about London. To which he annexed his promise of giving an exact account of the tides about Bristol, according to the directions given in the *Philosophical Transactions*.

Hereupon it was desired, that those members of the society, who had convenience and proper instruments, would take care of making the like observations in London in the approaching month of June; as also to observe the solstice; to the doing of which the president, Sir PAUL NEILE, Mr. BALLE, and Mr. HOOKE were particularly desired to attend.

Mr. DANIEL COXE produced his papers, containing a scheme prepared by him for composing and publishing an history of vegetables; and he intimated, that he had already written about an hundred sheets on this subject, requesting the society to favour him in this attempt with their assistance, and declaring his readiness, if any other member of the society had the like design, and had made a farther progress in it than himself, to consign his own labours to such a person. It was ordered, that these papers should be read at the next meeting, and that Mr. CHARLES HOWARD should be desired to peruse them in the mean time.

Mr. SKIPPON mentioning, that Mr. WRAY had likewise bestowed much of his thoughts and labours upon this subject, he was desired to acquaint him with Mr. COXE's design, and in the name of the society to desire his assistance in this noble undertaking.

The experiment of precipitating mercury in aqua fortis by putting in some white salt, was tried, but in that short space of time it did not precipitate.

It was ordered, that this experiment and the statical ones should be prosecuted at the next meeting; as also, that the rarefying engine should be brought thither, and the experiments formerly proposed tried therein.

May 30. At a meeting of the COUNCIL were present

^a Entered in the Supplement to the Letter-Transact. vol. iii. n^o 37, p. 726, for July Book, vol. i. p. 453, and printed in the Philos. 1668.

The President

The lord BRERETON
 Mr. H. HOWARD of Norfolk
 Mr. CHARLES HOWARD
 Mr. AERSKINE
 Sir PAUL NEILE

Sir ANTHONY MORGAN
 Sir JOHN LOWTHER
 Mr. COLWALL
 Mr. HOSKYNs
 Mr. OLDENBURG.

The president gave notice, that Mr. HENRY HOWARD had set out the ground for building the society's college upon, viz. an hundred feet one way, and forty feet the other. Hereupon Sir ANTHONY MORGAN was desired to draw up the conveyance of that ground, and to have it ready for the next meeting of the council; which he promised to do.

The lord BRERETON and Mr. HOSKYNs were desired to speak with Mr. CHEYNEY of Chelsea, and to request him to let them see his conveyance of the manor of Chelsea; which they promised to do.

Sir ANTHONY MORGAN and Mr. HOSKYNs were desired to appear on the Tuesday following in Westminster-hall, to defend the possession taken by the society of Chelsea-college against the pretensions of Mr. COLE.

It was resolved, that the lord BRERETON, Mr. HENRY HOWARD, Mr. AERSKINE, Sir PAUL NEILE, Sir ANTHONY MORGAN, and Sir JOHN LOWTHER meet on the Tuesday following at the president's house at fix in the morning, and together with his lordship attend the lord privy-seal about the dispatch of the patent, endeavouring to satisfy his lordship in the point of non-alienation.

Mr. Hooke acquainting the council, that he had now met with a man fit to be employed in the labour of making experiments for the society's service, who would be contented with twenty pounds a year for it; and declaring also, that if he had the service of this man, he would not fail to bring in three experiments every meeting; the council ordered thereupon, that Mr. Hooke should take this man for a quarter of a year's trial after the rate of the sum expressed; and that the said servant should be employed not only by him, but also by such other fellows, as should have occasion for him upon the account of the society, in making of anatomical or other experiments.

It was ordered, that Mr. OLDENBURG write a letter to Dr. WREN, to desire him to attend Mr. HENRY HOWARD at Oxford about the draught of the society's building.

To this letter Dr. WREN returned the following answer from Oxford June 7, 1668^a.

^a Letter-Book, vol. ii. p. 220.

"SIR,

"WHEN I waited upon his honour, HENRY HOWARD of Norfolk, he took delight to shew me some designs he had thought of himself for your building, and commanded me to trace out to him what I had considered, the same in effect I shewed you at London. But this at first appearance seemed to him too chargeable a design, but afterwards he acquiesced in the reasons I gave him; and having taken the sketch with him, and delivered your letter with his own hand, he enjoined me to give you an account of it. The design is indeed somewhat greater than was proposed, as being 100 feet long and 30 feet broad; which length Mr. HOWARD doth not scruple to allow you.

"It contains in the foundations first a cellar and a fair laboratory; then a little shop or two, for forges and hammer-works, with a kitchen and little larder. In the first story it contains a vestibule or passage-hall leading through from both streets; a fair room for a library and repository, which may well be one room, placing the books after the modern way in glass presses; or, if you will divide the room with pillars, it will the better support the floor of the great room above it, and so place the presses for rarities in the other. Upon the same floor is a parlour for the house-keeper; and from the vestibule the great stairs lead you up to the ante-chamber of the great room, and not higher.

"The great room for the meeting is 40 feet long, and two stories high, divided from the ante-chamber by a screen between columns, so that the whole length, in case of an entertainment, may be 55 feet. Upon the same floor is the council-room, and a little closet for the secretary.

"In the third story are two chambers with closets for the curators, and back stairs by them, which lead from the bottom to the top; one of the chambers being over the ante-room, looking down into the great room, very useful in case of solemnities.

"The fourth story is the timbers of the roof; which being 30 feet wide, and to be leaded, cannot be firm without bracing it by partitions to the floor below. These partitions are so ordered, as to leave you a little passage-gallery the whole length of the building, for trial of all glasses and other experiments, that require length. On one side of the gallery are little shops all along for operators: on the other side are little chambers for operators and servants. The platform of lead is for traversing the tubes and instruments and many experiments. In the middle rises a cupola for observations, and may be fitted likewise for an anatomy theatre; and the floors may be so ordered, that from the top into the cellar may be made all experiments for height.

"As for the charge of this fabric, I confess it is my opinion, that a fair building may easier be carried on by contribution, with time, than a fordid one. And, if I might advise, I could wish the foundations were laid of the whole: but then you need not build more than one half at present; and this may be
"done

"done for two thousand pounds, and will contain the necessary rooms, and so
 "you will leave yourselves an opportunity of enlarging hereafter upon the same
 "model. If you think to have a model made, I will willingly take care to have
 "it done. I have so folded the papers, as to shew you what part I would have
 "at present built; together with an extempore stair-case of deal boards and
 "laths. The cupola may be left till the finishing.

"S I R,

"I am your humble Servant,

"CHR. WREN."

June 4. At a meeting of the SOCIETY,

Mr. JAMES GREGORY * was proposed candidate by Mr. COLLINS, who from him presented the following treatises:

1. *De infinitis spiralibus inversis & infinitis hyperbolis; auctore STEPHANO DE ANGELIS.*

2. *Dialogus Opticus; auctore FRANCISCO ESCHINARDO.*

3. *Centuria problematum opticorum; auctore FRANCISCO ESCHINARDO.*

4. *Lettere Astronomiche di GIO. DOMEN. CASSINI sopra la Varietà delle macchie osservate in Giove.*

5. *Epbemerides Bononienses Mediceorum Syderum ex hypotes. & tabulis DOM. CASSINI.*

6. *Novissima Motuum Solis Epbemerides ex recentioribus tabulis DOM. CASSINI.*

7. *Martis circa Axem proprium revolubilis Observationes à DOM. CASSINI habite.*

8. *Spina Calestis, Meteore osservate da DOM. CASSINI.*

9. MICHAELIS ANOELI RICCI *Exercitatio Geometrica de Maximis & Minimis.*

Dr. KING brought in a writtten account of two anatomical experiments; one repeated in compliance with the order of the society, which was of fastening a bladder to the alpera arteria of a dog, formerly suggested by Dr. WALTER NEEDHAM; the other of his own contrivance, shewing, that a dog, on whom the former experiment is tried, may by slow breathing be made to live at least five times as long. The Doctor was desired to repeat the latter of these experiments in private, and both of them were ordered to be registered, as follow:

* He wrote his name GREGORIS.

† Register, vol. iii. p. 307.

“ The 26th of May 1668, we repeated the experiment of fastening a bladder to the aspera arteria of a dog, and followed the same method as before, in all material circumstances; and we found, that all answered our expectations; and as to the time of finishing the experiment, by the death of the dog, in what we expressed in our account, we were not mistaken the third part of a minute.

“ For, as we supposed then, when the dog, at the end of eight minutes, seemed dead, only a feeble motion of the heart being left, we revived him again with fresh air; yet we were confident, if we had let him alone but two minutes more, his life had been past our recovery; so in this experiment we found the same to happen in this dog, that at the end of about eight minutes, he was seemingly dead; yet, according to the commands we received, we let him lie two minutes more; and then our endeavours for life were all in vain, for he was past our recovery, notwithstanding we made the same endeavours for life, as before, when the other did recover.

“ Since that I repeated this experiment with some alterations, thus: I ordered a tube to be made with so small a canal, that the dog was forced to be three times as long in filling his lungs out of the bladder, as in either of the two other experiments, and so by consequence as long in returning the air again.

“ My observation was, that as I designed to keep the air cooler in the bladder than before in the other experiment, by causing a flow motion of the thorax; so my expectation was answered, and the bladder was not so warm in above 20 minutes, as it was before in five; and the dog moved his thorax by this means 40 or 50 minutes before he was so seemingly dead as the other was in eight minutes. And then with fresh air we recovered him again to a regular motion of the thorax, and strength of limbs.”

Mr. DANIEL COXE read his paper, containing a scheme of the History of Vegetables, designed by him for the public; which was ordered to be registered^a; and the society encouraged the author to endeavour to perform his undertaking, and exhorted other members, addicted to the study of vegetables, to assist in that comprehensive subject.

Mr. OLDENBURG read another part of the observations made by Mr. HENRY STUBBE in a voyage to Jamaica; and the whole was ordered to be filed up^b.

The society being put in mind to give order for the making of portable baroscopes, contrived by Mr. BOYLE, to be sent into several parts of the world, the operator was ordered to attend Mr. BOYLE, to receive his directions for filling them aright; and that being done, to make some of them forthwith, to be sent not only into the most distant places of England, but likewise by sea into the East and West Indies, and other parts, particularly to the English plantations, as Bermudas, Jamaica, Barbados, Virginia, and New England; and to Tangier, Moscow,

^a It does not appear in the Register.

^b These observations are printed in the Philos.

Transact. n° 27, p. 494, n° 36, p. 699, and n° 37, p. 717.

St. Helena, the Cape of Good Hope, and Scanderoon; in which last place it should not only be tried in the town itself, which is very unhealthy, but also on the top of the neighbouring hill, whither, it was reported, that travellers soon retire, after they have dispatched their business in the town, finding themselves well on that hill.

Mr. Hooke not being present, the experiments appointed for this meeting were referred to the next.

He was ordered to bring in a written account of the experiment made May 28, with aqua fortis glutted with mercury.

Mr. Boyle was put in mind of looking out his notes about making air fit for the respiration of animals.

Mr. Balle was desired to take care of observing the solstice, and to engage what assistance he could in it; as also to bring in his observations of the late horizontal eclipse of the moon.

He was likewise put in mind of making in this month observations concerning the declination of the needle.

Mr. Oldenburg read a letter to him, dated at Paris June 6, N. S. from Signor Magalotti, containing Mr. Steno's method of making the experiment of depriving a dog of all sense and motion, without depriving him of life. Dr. King was desired to try in private the experiment, according to this method, which he promised to do. The letter was ordered to be entered in the Letter-Book as far as concerned this subject.

June 11. Mr. James Gregory was elected and admitted.

Peter Courthope, esq; was proposed candidate by Dr. Wilkins.

James Arden, M. A. was proposed candidate by Dr. Downs.

Sir Robert Southwell presented the society with fifty pounds towards the building of their college, in a bond signed by him, and delivered in by Mr. Oldenburg.

Mr. Hooke brought in a written account of the seed of moss, observed by him to be of that exceeding smallness, that above seven hundred and seventy millions are required to make the weight of one grain; the method of computing which he explained. This paper was ordered to be registered*, as follows:

" Since the publishing of my Micrography, I have met with an observation, which, though it be of one of the smallest compound bodies I have hitherto taken notice of, yet does afford an hint of very great concern in natural philosophy;

* It does not appear in the Letter-Book.

† Register, vol. iii. p. 309.

" and

" and it does seem to make clear the cause of a phenomenon, that has appeared
 " dubious, not only to me, but to many other more knowing naturalists. I have
 " often doubted, I confess, whether moss, mushrooms, and several other small
 " plants, (which the earth seems to produce *ἀντομαίαν*) were the offspring of a
 " seed or grain, and have been apt to believe, that they were rather a secondary
 " production of nature; being somewhat the more inclined to be of that opi-
 " nion, because having formerly examined the small knots of seed-cods of moss
 " with a single microscope, I could not perceive any thing in them, that I could
 " imagine to be seeds, at least not so great a quantity, as seemed necessary to
 " maintain so numerous a progeny, as was every where to be found of it; that,
 " which then came out of them, seeming to be rather a pulp or pith, than any
 " thing like the seeds in other similar cods. But being since somewhat more in-
 " quisitive, I did examine several of the above-mentioned knobs or seed-vessels,
 " and found, that there were seeds in them, no less wonderful for the greatness of
 " number, than for the smallness of bulk. Taking then some of the ripe and
 " brown or reddish ones of them, and pressing them pretty hard, I found, that
 " there was a small dust went out of them, which seemed to vanish in the air.
 " Pressing and squeezing others of these upon a black plate, and examining
 " the powder with a microscope, I found it to be a great heap of exceeding small
 " seeds, globular, and pretty transparent: it is the smallest, I confess, I have yet
 " seen, and, it may be, that has hitherto been discovered. And unless that be a
 " plant, which I discovered growing on the blighted leaves of roses, and that
 " those small bodies be seed-vessels; or unless those knobs, I have discovered on
 " the top of mould, be the like, I cannot presently imagine, where there should
 " be found a smaller. For I find, that there will need no less than thirty-six
 " hundred of them to be laid one by another in a line, to make the length of an
 " inch, in the same manner as three barley-corns are laid to measure an inch:
 " and to cover a superficies of an inch square, there will need no less than nine
 " hundred and threecore thousands, besides twelve millions of single seeds: and
 " the number in a grain weight of them cannot be less than seven hundred and
 " seventy seven millions besides six hundred thousand single grains. And though
 " this may seem a most incredible narration, yet I would desire such, as are apt to
 " be too censorious, to take the pains to gather a few of those seed-vessels, and ex-
 " amine them as I have done, and then speak what they find, and believe no more
 " than their own sense and reason will inform them; and they may easily see, that
 " what I have asserted, will be rather short of, than exceed the real numbers.
 " Now if this shell of the seed be thus small, how much smaller must needs the
 " rudiment of the plant, that lies inclosed within it, be? and how easily may
 " such seeds be drawn up into the air, and carried from place to place even to the
 " top of the highest towers, or to places most remote, and be sowed by the passing
 " air, or falling drops of rain, on the bows or branches of trees, sides and tops of
 " walls, houses or steeples? And it is not in the art of man, to leave earth exposed
 " to the common air, and to exclude the entrance, or prevent the sowing of
 " these imperceptible seeds; and therefore it is not to be wondered at, that, if any
 " earth, though never so pure, be exposed to the air and rain, though at the top
 " of a steeple, it will produce moss. Farther inquiry may possibly instruct us,
 " that there may be seeds of mushrooms, mould, and other vegetables of as small,
 " if

" if not smaller, bulk, which may be disperfed and mingled with the air, and carried to and fro with it, till washed down by the falling drops of dews or rains, which, if they chance to light on a convenient foil, do there vegetate and spring up; but die and perish, if the ground, they light on, be not natural and agreeable. But whether this conjecture hit right, farther observation muft determine."

Mr. WRAY being defired by the fociety to affist Mr. DANIEL COXE in the compofing of his intended hiftory of vegetables, promifed, that he would contribute to it what he could.

Mr. HOOKE fuggested, that it was worth inquiry, whether there were any valves in plants, which he conceived to be very neceffary for conveying the juice of trees up to the height of fometimes 200, 300, and more feet; which he faw not how it was poffible to be performed without valves as well as motion.

He brought a written account to fhew the dilatation of bodies, whereby they are made to fill a larger fpace than they did before, not only when they are hot, but when perfectly cold. It was ordered to be registered*, as follows.

" I have formerly given an account of an experiment I made before this illuftrious fociety, to fhew the reducing of bodies into a more condensed ftate, as to the pofition of their conftituent parts; namely, in the experiment of the corrofion of water by oil of vitriol; which diffolvent being heavier than the body diffolved, we find, that the compound was heavier in proportion, than it ought to have been, if it had been only a fingle mixture. I now come to give an account of an experiment, to prove the apertion, expansion, or rarefaction of bodies, whereby they are made to occupy and fill a larger fpace than they did before; and this, not only when they are hot, but when perfectly cold: fo that they muft needs have acquired a new tone or texture of their conftituent parts, and fuch a one, as (if rarefaction proceeds from difperfed vacuities) muft needs contain void fpaces, greater either in quantity or number, than their former texture admitted. And this is, where the menftruum is lighter than the fubftance to be diffolved. The experiment was this; the comparative weight of aqua fortis was found by the glafs ball and fcales formerly mentioned; after which, half the weight of mercury was diffolved by it, and then the comparative weight of that mixture was tried by the fame means, and the weights were found thefe that follow:

" Ball in air	—————	—————	—————	307 grains.
" An equal quantity of aqua fortis	—————	—————	—————	207 gr.
" A quantity of water equal in bulk to the ball	—————	—————	—————	152 gr.

* Register, vol. iii. p. 306.

- “ A quantity of $\varnothing$ equal in bulk to the ball; $\varnothing$ being to } 2128 grains.
 “ water as 14. to 1. _____
- “ Therefore a quantity of the liquor compounded of aqua }
 “ fortis and half the weight of $\varnothing$ should have been } 300 $\frac{1}{2}$ gr.
- “ But it was found to be only _____ 285 gr.
 “ which is 15 grains lighter than it ought to have been, if, at least, the propor-
 “ tion between water and quicksilver be as 14. to 1.”

An experiment was made of the porosity of sand, being first well shaken and pressed together, to see, how much water it would take in afterwards. The sand was white hour-glass sand, and the quantity here used weighed nine ounces six drachms. The sand and water imbibed weighed both together eleven ounces one drachm and a half.

Mr. HOOKE was ordered to bring in writing a full account of this experiment, and to try the like about the porosity of albes at the next meeting; as also the experiment of weighing sal-gem in oil of turpentine.

The experiment formerly ordered to be made by Dr. KING of tying up the descending artery in the manner of Mr. STENO, being not yet tried, it was ordered, that Dr. KING now absent should be spoken to by the operator to take care of, it against the next meeting.

It was queried, whether Mr. STENO in his experiment might not take in the vein as well as the artery, and so take away sense and motion by stopping the circulation of the blood.

Mr. BALLE being asked what he had done about the observations of the solstice, desired further time; and Mr. GREGORY was desired to assist him in the observation.

Mr. BALLE was desired to observe the present variation of the needle affirmed by several persons in England to be now westward above a degree.

Besides the experiments already ordered for the next meeting, Mr. HOOKE and the operator were put in mind of having at length the rarefying-engine brought to try experiments therein, especially that with glow-worms.

The operator was again ordered to attend Mr. BOYLE, to see his method of filling the portable baroscope.

Mr. HOOKE was reminded of making the experiment concerning the floridness of the blood in the arteries, after it had passed through the lungs.

Mr. SLINGESBY produced some golden-coloured skains brought from the East-Indies; some of which were delivered to Mr. BOYLE, and some to Mr. DANIEL COXE, to examine whether they contained any metal.

June 18. Mr. ARDERNE was elected and admitted.

Mr. COURTHOPE was elected.

Mr. OLDENBURG presented for the repository from Sir ROBERT SOUTHWELL a skull of an executed person with the moss grown on it in Ireland.

Mr. OLDENBURG presented likewise from Mr. JOSEPH GLANVILL, the author, a book intitled *Plus ultra: or the progress and advancement of knowledge since the days of ARISTOTLE, in an account of some of the most remarkable late improvements of practical useful learning, to encourage philosophical endeavours. Occasioned by a conference with one of the notional way*.

Mr. GODOLPHIN acquainted the society, that he was shortly to go again into Spain; and mentioning in particular, that there were some books published in Spanish concerning mines, he was desired to procure them for the society; and as to those inquiries, which had been formerly recommended to him for that country, he was again requested to endeavour to obtain answers to them; which he promised to do.

An experiment was made of mixing sal-gem with water, to see how much it would grow heavier thereby. There were taken one part of sal-gem and four parts of water by weight:

	oz.	gr.
The salt weighed in air	1 $\frac{1}{2}$	10 $\frac{1}{2}$
The same weighed in oil of turpentine	$\frac{1}{2}$	47
The glass ball weighed in the mixture of the said salt and water	$\frac{1}{2}$	17 $\frac{1}{2}$
The same ball weighed in oil of turpentine	$\frac{1}{2}$	53 $\frac{1}{2}$

* It was printed at London 1668 in 8vo. The conference, which gave occasion to this book, was between Mr. GLANVILL and Mr. ROBERT CROSS, vicar of Great Chew in Somersetshire, a zealot for the Aristotelian philosophy, who had maintained in that conference, that ARISTOTLE had more advantages for knowledge than the Royal Society, or all the present age, had or could have; signifying this reason for it, because ARISTOTLE did *solum peragere solum*. The 12th chapter of Mr. GLANVILL's book treats of the Royal Society, and shews the reasons, nature, and design of their institution; and to the question, *What have they done?* returns an answer sufficient

to satisfy sober and candid men. But with regard to those, who would have had the society give them the great elixir, the perpetual motion, the way to make glass malleable and man immortal, or who objected, that they had done nothing, Mr. GLANVILL observed, that their impetuous taunts were no more to be regarded, than the little chat of ideots and children. Mr. CROSS wrote an answer to Mr. GLANVILL, at the instigation of Mr. STURGE, but it was rejected by the licensers both at Oxford and London on account of its scurrility. See Mr. GLANVILL's *Prefatory answer*, p. 2.

Mr. Hooke was ordered to calculate the proportion of these weights, and to bring in a written account of the whole at the next meeting; as also that of another experiment formerly made of this nature.

Another experiment made was of a new kind of barometer, filled partly with quicksilver, partly with water, to the end, that the variations thereof might be rendered more sensible than they are in those glasses, which are filled with quicksilver alone. Mr. Hooke was desired to bring in the description of this barometer in writing.

It was remarked by him, that the liquor in this kind of barometer will sometimes rise to thirty four inches; of which he did not yet see the reason.

The president was desired to get such a barometer as this prepared, and to make observations; which his lordship promised to do.

Mr. BOYLE proposed barometers to be filled with an amalgama of mercury and tin, or of mercury and gold: which altering the usual standard with mercury alone evince, that the whole matter of baroscopes depends merely on weight.

The smallness of moss-seed being again spoken of, and Mr. Hooke being desired to explain farther what method he used in computing, that the weight of above 777 millions of those seeds makes no more than the weight of one grain, he added, to what he had already said in his written account of it, that he reckoned, that two inches square of Venice-paper weighed one grain; and the length of thirty seeds laid close by one another equalled the thickness of Venice-paper: which being calculated after the manner described in his written account would amount to the sum above-mentioned.

Mr. Hooke being asked what kind of moss it was, the seed whereof he had thus examined, said, that it was of that sort, which he had described in his *Micrography*.

Mr. CHARLES HOWARD was desired to bring in what capillary plants he had for Mr. Hooke to view with a microscope the backs of the leaves of them, in order to observe what substances they are, that grow on them.

Dr. WILKINS moved, that Mr. Hooke might be ordered to try, whether he could by the means of the moss-seed shewn by him make moss grow on a dead man's skull.

Dr. CLARKE related, that a friend of his, a curious person, had written to him from Oxford, that the leaves of cardamine, commonly called cuckoo flower or lady's-smock, being put into the ground, would take root, even when cut into several pieces.

Mr.

Mr. CHARLES HOWARD and Mr. EVELYN were desired to try this, and to give the society an account of the success, which they promised to do.

It being moved, that a room might be provided to make anatomical experiments in, the president thought fit to refer this to the consideration of the council, and accordingly ordered the secretary to mention it at the next meeting of the council.

The experiments appointed for the next meeting were,

1. Mr. STENO's experiment to be made in public by Dr. KING.
2. To bring in two baroscopes to be constantly in the meeting-room; one filled with an amalgama of quicksilver and tin, the other with quicksilver alone.

June 19. At a meeting of the COUNCIL were present

The President

HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Sir PAUL NEILE
Sir GEORGE ENT

Mr. COLWALL
Mr. HOSKYNs
Mr. OLDENBURG.

Mr. HOSKYNs was desired to attend Mr. HENRY HOWARD between that and the next meeting of the council, to consider with him of the best way of giving a collateral security for the ground, where the college was to be built; and to make a report of it to the next meeting of the council.

Mr. HOOKE promised to bring in a complete draught for the building of the college on the Monday following.

N^o 36 of the *Philosophical Transactions*, was licenced.

June 22. The COUNCIL met again, there being present

The President

HENRY HOWARD of Norfolk
Mr. BOYLE
Sir PAUL NEILE
Sir GEORGE ENT
Sir JOHN LOWTHER
Dr. WILKINS

Mr. COLWALL
Mr. HAYES
Mr. HOSKYNs
Mr. CREED
Mr. OLDENBURG.

Mr. HOSKYNs reported, that he had conferred with Mr. HENRY HOWARD concerning the security of the ground given by him to build upon; and that Mr. HOWARD was willing to enter into a bond of six thousand pounds for performance of covenants forthwith, and into another of six thousand pounds more, that he

would within a twelvemonth either procure an act of parliament to enable him to make estates of the ground belonging to Arundel-house, notwithstanding the act of 3 CAR. I. that had intailed it; or other good and indefeasible title for the society; or else give them collateral security by conveying land to them.

The draught of the building being examined and agreed upon, Mr. Hooke was ordered to get a model of it made with one door, and to consider of the buying of the materials, and of contracting with workmen, to be paid by measure for so much a rod and square: as also to find out a person to be constantly present; and to see the workmen do their duty.

It being moved by the president and Dr. WILKINS, that Mr. GREGORY and Mr. WRAY might be excused from payment, it was ordered, that the treasurer should forbear to call upon them for payment till farther order of the council.

It was ordered, that the treasurer pay to Mr. Hooke fourteen pounds ten shillings for fitting the place in Gresham-college for the society's repository, according to his bill:

That Mr. OLDENBURG deliver the obligations hitherto subscribed by the fellows of the society for contributions to the building of their college, to the treasurer, taking from him a receipt for the delivering of them: and

That the treasurer begin to collect what is due by the said obligations.

Mr. HENRY HOWARD hearing, that the society wanted a room to make anatomical experiments in, offered one in Arundel-house for that purpose, which the council accepted of.

It was ordered, that Mr. HOSKYNs be desired to draw up against the next meeting of the council a draught of such security, as Mr. HENRY HOWARD offered to give.

June 25. At a meeting of the SOCIETY,

Col. COLLEPEPYR was admitted.

The apparatus for the experiment of tying up the descending artery after Mr. STENO's way, for depriving a dog of all sense and motion in the parts beneath the ligature, not being ready, it was referred till the next meeting; and the operator was charged to have what was necessary in readiness, and Dr. KING desired not to fail of performing the operation, who related, that he had again made the experiment in private, and found, that it succeeded after the method used and communicated by Mr. STENO; as also that without tying up the said artery, though the nerves were tied, the motion did not cease.

Mr. Hooke brought in a microscopical observation concerning the texture of
1 wood,

wood, tending to shew the manner of the juices ascending to the top of tall trees by a kind of valves : But the society not being satisfied with the observation made this day by a microscope of a piece of wood, it was ordered, that it should be referred to a clearer day, and that a better microscope should be provided for that purpose : as also that Mr. Hooke should look on a bullrush, to observe how the texture of that appears to be.

The president related, that he had made an experiment with mercury and water in a tube after the Torricellian way, and found, that the proportion of mercury to water was not as 14 to 1, but as 9 to one. His lordship was desired to observe, whether in this case there were not a bubble of air on the top of his barometer, wherein the experiment was made.

An experiment was made in the rarefying-engine with a flow-worm, which upon the exsuction of the air was found to swell.

Dr. BALLE mentioned, that near Smyrna was found an earth (some of which was to be had in London) which was made use of at Smyrna, instead of potashes, to make soap. He promised to produce some of it at the next meeting.

Sir THEODORE DE VAUX produced a draught of the old ruins lately discovered under ground in old Areconium or Kenchester in Herefordshire, sent by Mr. WALSH, referring to a letter of his dated April 26, and read on the 30th of that month. The consideration of this was referred to the next meeting, against which time Mr. OLDENBURG was desired to look out that letter.

Mr. OLDENBURG presented the society with a little piece of the stone called *ludus Helmontii*, dug up near Antwerp, out of the earth on the river's side, together with a description of the situation of the said stone under ground.

Mr. OLDENBURG read a Latin letter to him from Mr. HEVELIUS, dated at Dantzick 13th of June 1668, N. S. giving notice to the society, that his *Cometography* was now printed, and a copy of it in the way for them, which he submitted to their judgment. This letter containing some exceptions to what had been formerly communicated to him by Mr. Hooke about telescopical sights as much better than the common ones for quadrants, sextants, and levels, and especially for all kinds of celestial observations ; it was ordered, that a copy of that part of the letter should be given to Mr. Hooke, to declare himself farther about it ; and that the letter itself should be entered in the Letter-Book.

Mr. OLDENBURG read likewise a letter to him from Monfr. AUZOUT, dated at Paris June 26, 1668, N. S. desiring the society to honour him with their commands in his journey, which he was going to take into Italy. It was ordered, that the secretary should thank him for his respects to the society, and let him know, that it would be very acceptable to them, if he would communicate such philoso-

phical observables and curiosities, as he should meet with in those parts, whither he was going. His letter was ordered to be entered in the Letter-Book *.

The experiments appointed for the next meeting were

1. That of Mr. STENO above-mentioned.
2. The mixture of mercury in aqua fortis, to see whether the weight of the whole be different from the sum of the particular weights of those bodies before mixture.
3. To bring in the two barometers appointed at the last meeting.

June 29. At a meeting of the COUNCIL were present

The President

Mr. HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Sir PAUL NEILE
Sir GEORGE ENT
Sir JOHN LOWTHER

Dr. WILKINS
Mr. COLWALL
Mr. HOSKYNs
Mr. OLDENBURG.

Mr. HOSKYNs being called upon for the draught of Mr. HOWARD's security, said, that he had delivered it to Mr. HOWARD's solicitor to be considered.

Mr. HOOKE was ordered to bring in at the next meeting of the council an estimate of the charge both of the materials and workmanship of the building.

Dr. WILKINS and Mr. HOOKE were desired to speak with Mr. NELTHROP about timber.

It was ordered, that Dr. CLARKE and Dr. LOWER be desired by Mr. OLDENBURG, to make a list of the particulars necessary for the making of anatomical experiments.

The order signed in council for the payment of thirty pounds ten shillings for the repairs of Chelsea-college was delivered to the treasurer.

July 2. At a meeting of the SOCIETY,

A Latin letter was read from Sir WILLIAM CURTIUS to the society, dated at Umbstad June 5, 1668, giving them thanks for the honour done him by electing him into their body, and promising to communicate such philosophical observables, as he should meet with. It was ordered, that this letter should be entered in the Letter-Book *, and that the secretary should acquaint Sir WILLIAM with the sense, which the society had of his respect for them, and of his readiness to promote their designs.

Sir ROBERT MORAY presented the society with some curiosities, which he had brought with him out of Scotland, viz. 1. a kind of lapis albestus, but

* Vol. ii. p. 232.

* Ibid. p. 217.

altogether stony and very ponderous. 2. A piece of a bone grown out of a horle's head. 3. An egg laid by a Schetland hen, as small as a pigeon's egg, which he said was the ordinary size of the eggs of that country, laid by the hens there, which are very small.

Dr. BALLE presented some of the soap earth, mentioned by him at the last meeting, used at Smyrna instead of pot-ashes, and digged from under a cliff near that city. It was infused in water, and found to yield a lixiviate taste.

He presented likewise a branch of an ivy with white leaves on it, from a tree on a hill in Devonshire.

Some of the soapy earth was ordered to be given to Mr. BOYLE, to examine the qualities of it more particularly.

Mr. OLDENBURG presented from the author, Monfr. DE CORDEMOY, a small French book, intitled, *Discours Physique de la parole*¹, and gave some account of the particulars contained in it, and mentioned, that it was translating into English.

He produced and read some inquiries and progresses made by Mr. GREGORY of the weight of bodies mixt, of the acceleration of descending bodies, of the increase of gravity by load-stones, of the reflection of falling bodies, of the refraction of bodies shot at several inclinations into wooden vessels full of liquor, &c. Mr. GREGORY was desired to think upon experiments proper to answer these questions. In the mean time Sir ROBERT MORAY was desired to recommend to Col. TITUS the trial of shooting with a gun upwards and downwards, to see, whether the bullet penetrates to an equal depth in the earth. And Mr. HENSHAW was desired to try the same with a cross-bow, which he should be furnished with by the operator.

The experiments appointed for this meeting not being prepared by reason of the operator's indisposition, it was ordered, that on the like occasion another person should be hired and made use of *pro tempore* to do the manual part, that the society might not be destitute of experiments.

These experiments were again ordered to be prepared for the next meeting, viz. STENO's experiment, the mixing of mercury and aqua fortis, and the examining of the texture of wood by a good microscope.

July 6. At a meeting of the COUNCIL were present

The President

Mr. HENRY HOWARD
Mr. CHARLES HOWARD
Sir ROBERT MORAY
Dr. WILKINS

Mr. HAYES
Mr. COLWALL
Mr. HOSKYNs
Mr. OLDENBURG.

¹ Printed at Paris in 12°. See an account of it in the Philos. Transact. vol. iii. n° 37, p. 735.

It was ordered, that Mr. Hooke make a draught for the building of the college, representing the front thereof to the Thames, and to draw it with the windows, Mr. HOWARD having declared, that it was indifferent to him, which way it stood, so it might be contrived for the conveniency of the society.

Mr. Hooke was again ordered to prepare the workmen, and to look after materials; as also to make an estimate of the charges, according to this last position of the building.

The president and Sir ROBERT MORAY undertook to speak with the lord privy-seal about passing of the new patent.

The treasurer was desired to endeavour to get in such portions of the sums subscribed, as were then due.

July 9. At a meeting of the SOCIETY,

The experiment of mixing mercury and aqua fortis together was made.

The mercury weighed	—	—	1 $\frac{1}{4}$ ounce
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The aqua fortis weighed	—	—	4 $\frac{1}{2}$ ounces
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The ball in aqua fortis weighed	—	—	131 grains.
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The solution of mercury lasted too long to make an end of the experiment at this meeting; and therefore the issue of it was referred to the next.

The other experiments ordered at the last meeting were also deferred to the next.

Mr. Hooke proposed an experiment to try in an instrument for compressing the air, how much longer a bird would live in the compressed air of a glass, than in the ordinary air of it. Accordingly a bird was put into the glass with ordinary air at six minutes past five o'clock, and taken out at thirty minutes, when it began to be sick. Being taken out and recovered, it was put in again at forty minutes, and three quarters of the air was compressed upon it in the space of eleven minutes by the gage. The bird was kept in this condensed air for thirty three minutes, and seemed to be very well. But the instrument not being stanch, it was ordered, that the experiment should be repeated at the next meeting, so as to provide divers glasses of several dimensions, and some birds of the same kind, to see, whether there would be an equal proportion between the time of the bird's life, and the quantity of air in the glasses.

Mr. Hooke affirmed, that an experiment had been formerly made by order of the society, as would appear by their Journal, where a burning lamp lasted much longer in compressed than uncompressed air. The ananuelis was ordered to consult the Journal for that purpose against the next meeting.

Mr.

Mr. OLDENBURG produced and read a letter to him from THOMAS WRIGHT, esq; a justice of the peace of Downham in Suffolk, dated July 6, 1668, containing an exact account of the sand-flood in that country, and the damage done by it, together with some remedy successfully employed to reduce it to *terra firma*. To which were added some observations about improving a barren heath by marling. This letter was ordered to be entered^{*}, and the writer desired to continue his communications.

Mr. SKIPPON mentioned, that there were the like moving sands about St. Ives in Cornwall, and was desired to procure an account of them.

Sir THEODORE DE VAUX produced a scheme and description of some old ruins lately discovered under ground, in old Æreconium or Kenchester in Herefordshire.

He was desired to give Mr. JOSEPH WALSH, who sent this paper, the thanks of the society; and it was ordered, that it with the letters accompanying it should be filed up.

Mr. HOSKYNs produced two tortois'es eggs about the size of pigeon's eggs; one of which was taken by the president to be hatched by a hen; and the other given to the curator for the repository.

Sir ROBERT MORAY presented the society with an old very curious almanack, wherein THOMAS à BECKET was the youngest saint.

Mr. OLDENBURG read the Latin letter, which he had drawn up, according to a former order, to Sir WILLIAM CURTIUS; which was approved of, and ordered to be sent, and a copy of it entered in the Letter-Book^{*}.

July 13. At a meeting of the COUNCIL were present

The President

HENRY HOWARD of Norfolk
Mr. CHARLES HOWARD
Sir ROBERT MORAY
Sir PAUL NEILE

Sir GEORGE ENT
Dr. WILKINS
Mr. HOSKYNs
Mr. OLDENBURG.

There were examined two draughts for the building of the college, both fronting to the water, one of Mr. HENRY HOWARD, the other of Mr. HOOKE. The determination, which of them should be followed, was referred to the next meeting of the council, at which Mr. HOWARD was desired to bring in his design of ordering the whole plot of his ground,

^{*} Letter-Book, vol. ii. p. 254. It is printed for July 1668.
in the Philos. Transact. vol. iii. n^o 37, p. 722; ^{*} Vol. ii. p. 235.

The president and Sir ROBERT MORAY were put in mind of speaking to the lord privy-seal about passing the patent.

July 16. At a meeting of the SOCIETY,

The experiment of Mr. STENO was tried, according to his method, before the society by Dr. KING, and succeeded, so as the dog, upon whom it was made, was seen to be deprived of all motion below the part, where the descending artery was tied, which was upon the top of the spine by a needle passed through between the 8th and 9th ribs.

Mr. HOOKE produced a new kind of level invented by himself, with a piece of glass bent into a curve, having this advantage above other levels, that it is of a true figure; other levels made with glass canes not being so. But because the water and bubble of air in the water is subject to rarefaction and condensation, it was thought necessary, that another liquor should be employed, that is not so. It was ordered, that one of those levels should be made for the repository, and a description thereof brought in for the register.

Mr. OLDENBURG produced a paper in Latin of Dr. WALLIS, dated at Oxford July 8, 1668, commending Mr. NICHOLAS MERCATOR's *Logarithmo-technia**, lately printed, and making the quadrature of the hyperbola universal to all hyperbolas, with a desire, that since by this means the quadrature of the hyperbola was now so complete, as that scarce a better could be expected, and this work perfected by members of the society, this letter might be entered in their Register-Book, the more effectually to declare the invention their's. It was read, and ordered to be registered accordingly†.

Sir ROBERT MORAY communicated a letter to himself from Dr. WALLIS, dated at Oxford July 14. containing his thoughts of some experiments mentioned in BORELLI's book *de Vi percussione*, and principally of this, that a pendulum stopped

* The whole title is, *Logarithmo-technia, seu methodus construendi Logarithmos nova, ac, ut aiunt, & facili, scriptis antehac communicata, anno sc. 1667. auct. Augusti: Cui sunt additi etiam Quadraturæ Hyperbolæ & Inveniti summe Logarithmorum. Auctore NICOLAO MERCATORE Holsat. & Societatis Regiæ. Hinc etiam jungitur MICHAELIS ANGLI Riccii Exercitio Geometrica de Maximis & Minimis, hic ab aloganti præstantiam & Exemplarium variaturæ scripta. London 1668. in 4.* Dr. PELL was highly displeased with Mr. MERCATOR on account of this book, as appears from his original draughts of several letters to Mr. JOHN COLLINS, extant among the doctor's papers given to the Royal Society in July 1755. "In his letter of August 29. 1668, he says: "Riccio" will not think this, that coupled him with "MERCATOR. It may be, it will make him set

"some body to write against him, for he will not do it himself. I shall not wonder to see some transmarine pen fly at him. If he print not the same things in English, I shall let him alone, till the incomposit and their logarithms bring him in my way." And in another letter, dated Sept. 16. he has this passage, "I have known Mr. MERCATOR above 24 years, and never had any cause to fall out with him, much less to envy him. I hope you will not suspect, that my dislike of his book arose from some pique against his person." Dr. PELL made some remarks on Mr. MERCATOR's book, which are likewise extant.

† Register, vol. iv. p. 1. It is printed in the Philos. Transact. vol. iii. n° 38, p. 753, for August 1668.

about the middle of its motion, the bullet swinging only to the lower half of the string, shall spend the same time in finishing its excursions, as if the string had continued to move freely at its whole length: Which experiment the doctor desired might be well tried. This letter was ordered to be entered in the Letter Book^a; and the president undertook at his leisure to look on the place of the book itself cited by Dr. WALLIS.

The Journal of the society was consulted about the experiment formerly made concerning the longer duration of a lamp in compressed than uncompressed air; and it was found in the notes of January 25, 1664, that it was so as Mr. HOOKE had affirmed at the last meeting, which was, that a lamp lasted much longer in compressed than common air.

Mr. HOOKE produced some petrified bodies vitriolated, which he affirmed to be the teeth of sharks.

He remarked likewise, that he had found many shells in Portland-stones; and that at that very time it might be seen in such stones lying about the Royal Exchange.

Others, as Dr. BALLE and Mr. SKIPPON, took notice of shells plentifully to be found on the tops of hills, particularly on the Apennines, and likewise in England; which was conceived by some not possible to be solved but by earthquakes, though others thought it might be by the deluge.

Mr. HOOKE upon occasion intimated, that he thought alkalis being exposed to the air would arrest the volatile salt, which is in the air, and turn it into nitre.

Mr. COXE offered it to the consideration of the society, whether the air added that nitrous substance to alkalis, or extricated it out of them?

It was conceived, that this might be best decided by weight, viz weighing a certain quantity of oil of tartar before the exposing it to the air and after.

Mr. COXE mentioned a way which he had, of so fermenting vegetables without additament, that being distilled, they would yield that in the form of a volatile salt, which, if the herbs were incinerated, would be an alkali.

The experiment of mixing aqua fortis and mercury, begun at the last meeting, could not be finished at this, and was therefore referred to the next; as also the experiment of inclosing birds in divers glasses of several dimensions, begun to be tried at the last meeting.

July 23. Mr. HOOKE presented for the repository several petrified teeth, said to have been found in Sheerness, and there taken out of a rock on the sea-side, conceived to have been the teeth of shark-fishes.

^a Vol. ii. p. 238.

Mr. SKIPPON presented likewise for the repository the like teeth, and several other stones and medicated earths, brought by him out of Malta.

Dr. MERRET was called upon for the account, which he had promised March 26, to give of the book of the Florentine experiments; and he excusing himself, that the book had been sent for by Mr. HOOKE, before he had made an end of perusing it, Mr. HOOKE was desired to return the book to the doctor.

Dr. MERRET produced a vinous liquor, which he affirmed to have been made of nothing but English plants. It was sweetned with sugar, and had the flavour of Malaga sack. He was not willing to name the plants, but expressed his resolution to improve the liquor first.

He remarked, that he thought it worth while to consider the change of liquors into vinegar, and to procure the history of vinegar-making, both of wine and beer; as also to make the experiments for clearing up this matter.

Mr. OLDENBURG offered his service in endeavouring to procure the way of making wine-vinegar in France, and the operator promised, that he would endeavour to learn the way of making beer-vinegar in London.

Dr. MERRET was desired to devise and try some experiments proper to illustrate this subject, as by closing up wine, beer, &c. in glasses hermetically sealed, by exposing the like liquors to the sun, &c.

The Swedish resident^b mentioned, that he had seen mariners, when their beer was grown sour, throw chalk into it, whereby the beer was recovered.

It was remarked by Dr. MERRET, that the liquor might be by that means freed of its acidity; but that it would be depauperated of its strength.

Mr. HENSHAW affirmed, that some persons being troubled with the heart-burning (caused perhaps by some extraordinary acidity in the blood about the heart) use to swallow chalk, and thereby cure themselves.

The contents of Dr. WALLIS's letter to Sir ROBERT MORAY produced at the last meeting being spoken of, the president said, that he had read BORELLI's proposition, cited by the doctor, and conceived this to be the author's sense, that the line of a pendulum being staid by a pin or other thing in the perpendicular line any where, the bullet holds on its motion beyond the perpendicular (though in another circle) to near the altitude of the same horizontal line, from whence it fell, decreasing after the same velocity, in which it before accelerated, moving like spaces in proportionable times, accounted from the perpendicular each way, where the circles unite.

^b Monsr. LEYONBEACH.

Concerning the other proposition of BORELLI mentioned in the same letter, viz. that, which way soever a heavy body be violently cast, the natural motion of descent by reason of its gravity (with which the motion of projection makes up its compound motion) is still the same; it was conceived by the president, Sir ROBERT MORAY, and others, that it was truly so, *medio non impediante*; the experiments of sounding, formerly made by some members of the society, confirming the same, by which it appeared, that the sounding-balls, whether they emerged obliquely in a swift stream, or perpendicularly in a still water, rose always in equal times.

The experiment of incorporating mercury and aqua fortis was prosecuted, and the ball being weighed in the mixture (which was four ounces) weighed fifty six grains, and in the tartar 168 $\frac{1}{2}$ grains. After which there was put a quarter of an ounce of oil of tartar into the mixture to precipitate the mercury, but without any effect for want of room: for which reason it was ordered, that another mixture should be made against the next meeting.

The experiment with the birds was also ordered to be tried at the next meeting.

July 30. EDWARD HOWARD, esq; was proposed candidate by his brother HENRY HOWARD of Norfolk.

The experiment of shutting up two finches in two glasses of different capacity was tried. The vessels were closed with very good cement, the one containing about four and a half times the liquor of the other. The birds were both put in at the time of fifty five minutes past four. That in the smaller glass appearing ready to die, after it had been kept in for the space of nineteen minutes, was taken out, but found dead, so that it could not be recovered. The other was kept in about an hour and twenty eight minutes, and appearing to be sick, though not so very much so, was taken out, it being time for the society to rise; whereby it seemed, that the times and the quantities of the air necessary for respiration in these birds were almost in reciprocal proportion to one another.

This experiment was ordered to be tried in compressed air at the next meeting.

The proposal made at the last meeting for trying the ways of making liquors acid being again spoken of, the operator was ordered to put wine, cider, and ale in several glass vessels, and having sealed them up, to expose them to the sun, to see whether the liquors would grow sour, though there was no avolation of parts.

Mr. OLDENBURG read part of a letter written to him from Monfr. JUSTEL dated at Paris July 25, 1668, N. S. ¹ about the circulation of Juices in plants; concerning which it was said, that some of the curious in France were apt to think, that the center of that circulation was in that place, where the roots of a plant united

¹ Supplement to the Letter-Books, vol. v. p. 122.

in shooting downwards and upwards, in regard that when that part was cut, the plant intallibly died, which it did not, though the roots about it were cut away, or though the trunk of a plant were cut off near the ground.

Some of the members said hereupon, that this might prove the center of germination, but they saw not how thence could be concluded the pretended circulation.

Others suggested, that some plants grew only by a leaf or a sprig put in the ground, without having any roots.

Dr. GODDARD affirmed, that he and some others had formerly made an experiment, in order to find out, whether there were any circulation in plants, tying them about very close with a piece of leather; whereupon they had found, that after some time those branches swelled considerably above as well as below the ligature.

The president remarked hereupon, that the tumor above the ligature was not a proof of a circulation, because the juice being hindered from ascending by degrees forcibly made its way by stretching in time the leather, and then passing through plentifully caused that swelling above the leather.

The operator related, that he had once bared a part of a top branch of an apple-tree, and put loam about the bared part, whereupon he had found, that at the fall of the leaf, the leaves below the loam being fallen off, those above it staid on, but withered.

Mr. HOOKE suggested, that it should be tried, of what use the pith in plants might be, by stopping the pith, or cutting it.

He affirmed, that he had observed, that charring of wood shewed other kind of vessels than the rotting of them did.

It was observed out of the description of Surinam published by Mr. GEORGE WARREN, that though there be a constant verdure of plants in Surinam, and that held true, not only in all trees natural to that country, but also in transplanted vines; yet that an European apple-tree did always shed its leaves, and continued bare, as it doth in its native soil, all the winter-months, growing green again in the spring.

Sir THEODORE DE VAUX produced an account of the way of making copperas, as he had found it among Sir THEODORE MAYERNE's papers. It was read, and ordered to be compared with the accounts formerly brought in upon that subject by Sir ROBERT MORAY and Mr. COLWALL.

Sir

Sir ROBERT MORAY queried, what the iron did in the copperas-work; and he thought it desirable to try the work without iron, and therein to observe, both what quantity and what kind of copperas would then be produced.

Dr. BALLE said, that the addition of iron kept the copperas drier, and prevented its yielding to the air.

It was also queried, whether no other metal than lead would serve to boil the copperas in? Whether it had been tried in iron, or copper, or tin, or earthen vessels?

It was answered by some members, that all other materials would be corroded; and Dr. MERRET affirmed, that he knew a little stone, which being put into the copperas, when boiling, would make it corrode lead also.

Sir THEODORE DE VAUX offered to the society the perusal of certain papers about chemistry, which he had in his hands from Sir THEODORE MAYERNE. It was ordered, that they should be referred to the committee for chemistry, and as many of that committee be desired to meet, during the discontinuance of the meetings, as conveniently could, to consider thereof.

The experiments appointed for the next meeting were,

1. That above-mentioned of birds in condensed air.
2. The mixture of mercury and aqua fortis.

August 6. Mr. EDWARD HOWARD was elected.

A microscopical observation, devised by Mr. HOOKE, was made on a little lump of charcoal of fir-wood, in which appeared here and there interstices or partitions intersecting the great pores. Several of the members saw it, and were satisfied. Mr. HOOKE affirmed likewise, that some of the smallest pores had the same interstices; and added, that he was inclined to believe, that there were valves in wood, since it appeared not possible, that in trees of two or three hundred feet high (as there are such between the tropics) the sap should ascend to that height by filtration, which carries liquor no higher than thirty six or forty feet.

Several queries were proposed about the texture of trees, in order to consider of their solution by experiments; as, whether the sap of trees runs out, when it is ascending, or descending, or at both times? Whether any sap ever descends? Whether there be any trees, which, being bared of all, even the innermost bark, will grow? Whether the pith being cut cross, a tree will grow?

It was thought desirable, that more queries might be thought of concerning this matter: whereupon the president, Mr. BOYLE, Sir ROBERT MORAY, Sir GEORGE ENT, Mr. ILENSHAW, and Mr. HOOKE promised to draw up some: which being done, Mr. CHARLES HOWARD was desired to make observations to answer them.

Mr.

Mr. BOYLE presented a pistol-bullet, in part covered with a stony substance, said to have been voided out of the bladder of a woman, who had five or six years before swallowed it for the twisting of the guts^a. It was thought by the members present very difficult to account how the bullet could come into the bladder.

Sir GEORGE ENT mentioned, that he knew, that a bodkin incompassed with stone had been found in the bladder of a woman, swallowed down, when one came behind her, on a sudden, and surprized her by laying hold of her.

Mr. BOYLE related, that a Danish anatomist had lately acquainted him, that there had been found a cockle-shell of the size of an English sixpence in the gall-bladder of a greyhound, who died after great pains perceived in him, and was opened to find his disease. He added, that the person, who wrote the account to him, was a good dissector, and had been present when the said shell was thus found. It was likewise thought difficult to conceive, how this shell could come into the gall-bladder.

An experiment of compressing air on birds was made twice with the same success, viz. that a finch being put into a glass of the capacity of about a pint at 20 minutes past five o'clock, and the air being condensed to one eighth part (which appeared by a gage) the bird was killed in 24 minutes.

Another bird of the same kind was closed up in a glass four times and a half as large as the former, and being left in the common uncompresssed air, it appeared very sick after the space of an hour.

Mr. BOYLE mentioned, that he intended to try what operation the air had on the sensitive plant.

Mr. OLDENBURG communicated a letter to him from Sir JOHN FINCH, the King's resident with the Grand Duke, dated at Florence July 14, 1668, acknowledging the receipt of the society's letter to Prince LEOPOLD Cardinal de Medicis; and of the *History of the Society*, which was presented by Dr. BAYNES to the Cardinal; and giving notice of a book of Dr. REDI, the Great Duke's physician, *de generatione insectorum* almost printed off. This letter was ordered to be enter'd in the Letter-book¹.

Mr. OLDENBURG related, that at Vienna in Germany, the experiment of transfusion had been made on several dogs with good success; and that amongst the rest an old dog scarce able to go about for age, had been by the transfusion of blood from a vigorous one restored to great vigor: and that it was resolv'd there to prosecute the experiment, and to try it on men.

^a An account of this is printed in the *Philos. Transact.* vol. iii. n^o 40. p. 303. for Octob. 1668.

¹ Vol. ii. p. 265.

He related likewise, that he had received notice from Rome, that EUSTACHIO DIVINI had improved microscopes, using two common object-glasses and two plano-convex eye-glasses joined together on their convex sides, so as to meet in a point; the tube as big as a man's leg, and the eye-glasses little less than the palm of one's hand.

It was resolved, that the meetings of the society should be intermitted for some time, many of the members being at this season of the year in the country; and that the president should be desired to send about a summons, when he should be informed, that there was a competent number of fellows in town again.

In the mean time Mr. HOOKE was ordered, during this vacation, to make the experiment in the Park for the mensuration of the earth; and that of observing the parallax of the earth's orb: and it was recommended, that the committees of the society might meet as often as conveniently they could.

August 10. At a meeting of the COUNCIL were present

The President

Sir ROBERT MORAY
Mr. AERSKINE
Mr. HENRY HOWARD
Mr. CHARLES HOWARD

Sir JOHN LOWTHER,
Mr. COLWALL
Mr. OLDENBURG.

It was resolved, that the building of the college should be deferred till spring, and in the mean time good materials be provided.

Mr. HOWARD promised, that he would endeavour to procure an act of parliament for letting of leases against that time.

Octob. 22. This day the society, after the intermission of their meetings for ten weeks, began to meet again; when there were produced some presents, and read several papers, containing divers communications to the secretary for the society since their last meeting.

There was presented from Mr. HEVELIUS his *Cometographia*, wherein he taking particular notice of the society in his address to the reader, and submitting the whole book to their judgment and censure, it was desired by the president, that those persons, to whom the author had particularly presented copies of his book, as he had done one to the whole body, would peruse it, and bring in their thoughts upon it. Those persons were named to be the bishop of SALISBURY, Dr. WALLIS, Mr. HOOKE, and Mr. OLDENBURG: and it was ordered, that the thanks of the society should be returned to Mr. HEVELIUS^a.

^a Mr. OLDENBURG's letter for that purpose was dated Octob. 23, 1668, and is entered in the Letter Book, vol. ii. p. 293.

Sir ROBERT MORAY presented from Sir PHILIBERTO VERNATTI, governor of the Dutch East-India company at Batavia in Java Major, several curiosities of those parts; viz. 1. The picture of a musk-deer, drawn according to the life, whose navel was affirmed by Sir PHILIBERTO to be the only part, which gives or is the true musk. 2. The pictures of several spices and other vegetables, as the clove tree with all its parts; the nutmeg-tree with its parts and several kinds, there being one sort called *the thieving nutmeg*, of which there being but one mixed among a whole storehouse full of the good sort, it will infect and corrupt them all. 3. The sagwee-tree yielding a liquor far above that of the cocoa-tree. 4. The sagou-tree, yielding bread in the Molucco's. 5. A nameless herb shaped like a can with its cover, which, if opened even in the hottest weather, is half full of water. 6. Three small cans filled with Macassar poison, together with a description of its use upon arrows. For the trial of which poison a dog or cat were ordered to be provided against the next meeting.

The earl of SANDWICH's observations made by himself during his embassy in Spain and Portugal, of the last comet seen by himself at Lisbon the first time on Feb. 25, 1664, O. S. and of the eclipse of the moon of May 11, 1668, were produced, and ordered to be registered *.

MONSIEUR THEODORE DE BERINGHEN presented the society with Dr. REGNER DE GRAAF's book, intitled, *De virorum organis generationi inservientibus* *.

MONSIEUR DE BERINGHEN signifying his intention of returning to Paris, and expressing his readiness to serve the society there, he was thanked for this respect to them, and desired to acquaint the Royal Academy of philosophers there, how glad the society would be of a good correspondence and conjunction for the carrying on of the common design of advancing experimental philosophy.

MR. OLDENBURG read a letter written to him from Bermudas, dated July 16, 1668, by Mr. RICHARD STAFFORD, sheriff of that island, containing divers particulars relating to the tides, whales, spermæ ceti, poison-wood, extraordinary webs of spiders, some rare vegetables, and the longevity of the inhabitants: which letter was ordered to be entered in the Letter-Book *.

MR. OLDENBURG produced the papers brought by Sir ROBERT SOUTHWELL from Portugal, written by Father JEROM LOBO, a Jesuit, and an eye-witness of most of the particulars contained therein, which were, 1. A relation of the river Nile, its source, current, and inundation. 2. An account of the real existence and the place of abode of the unicorn. 3. Of the Abyssine emperor, vulgarly called Prester JOHN. 4. Of the Red-Sea and the cause of its denomination. 5. A discourse of palm-trees, their variety, fruit, usefulness, proper soil, &c.

* Register, vol. iv. p. 15.

* Printed at Leyden 1668, in 12°.

* Vol. ii. p. 241. It is printed in the Philos. Transact. vol. iii. n° 40. p. 792. for Octob. 1668.

These papers being originally written in the Portuguese language, and having been thence translated into English by Sir PETER WYCHE, it was ordered, that the translation should be preserved upon the file.

Mr. OLDENBURG communicated some papers concerning the Mendip mines by Mr. GLANVILL, who affirmed in a letter accompanying these papers, dated August 15, 1668, that he had procured this account from very experienced mine-men. It was ordered, that this account be registered¹.

Mr. OLDENBURG remarked, that he had several other letters and papers sent him since the last meeting of the society, from Seville, Milan, Paris, Bristol, and Yeovil, all relating to philosophical matters; the reading of which was referred to the next meeting.

It being considered what experiments should be tried henceforth, the president mentioned, that he had understood, that Mr. HOOKE had erected a tube to try, whether he could observe to a second minute the passing of any fixt stars over the zenith, and thence find a parallax of the earth's orb, in order to determine the earth's motion.

After this it being proposed by Mr. HOOKE, that the experiments of motion might be prosecuted, thereby to state at last the nature and laws of motion, the president desired, that it might be considered, whether it were so proper or necessary to try this sort of experiments, since Monsr. HUYGENS and Dr. CHRISTOPHER WREN had already taken great pains to examine that subject, and were thought to have also found a theory to explicate all the phenomena of motion.

It was ordered thereupon, that Mr. OLDENBURG should be desired to write to both those persons, and acquaint them with what had been said in the society of them, and of this matter; and to desire them, that, if they did not yet intend to publish their speculations and trials of motion, they would communicate them to the society for their consideration, and be assured, that they should be registered as their productions².

The president moved, that the persons formerly desired to peruse and consider the bishop of CHESTER's *Essay towards a real character and a philosophical language* should be called upon at the next meeting to bring in their thoughts concerning that book.

Octob. 29. Mr. HOOKE produced an instrument for measuring a second of time by the sun, or for making the motion of the sun to be perceived every second. It not being yet perfect, he was desired to make it so against the next meeting.

¹ Register, vol. iv. p. 9. It is printed in the Philos. Transact. vol. iii. n^o 38. p. 767. for Sept. 1668.

² Mr. OLDENBURG's letter to Monsr. HUY-

GENS dated Octob. 26, 1668, is entered in the Letter-Book, vol. ii. p. 203. and that to Dr. WREN dated Octob. 29, 1668. *ibid.* p. 302.

He acquainted the society, that all the observations, that he could make of the late eclipse of the sun, which happened the 25th instant, was only to see the beginning of it, which was *b. 11. 5'. matut.* and a few seconds: whereas WING in his almanack had calculated the beginning *b. matut. 11. 17'. 58"*.

An experiment was tried of falling bodies in a glass-cane about four feet long, exhausted of air, in which a feather let fall came down to the bottom in four seconds: but when the air was re-admitted, in six seconds. The glass not being well exhausted. and too short, it was ordered, that a longer glass should be provided against the next meeting, and care taken, that it might be then better exhausted.

Mr. HOOKE mentioned an experiment made by Mr. BOYLE of including bellows in a glass exhausted of air, to see, what effect the bellows working would have on the subtle matter remaining in the vessel; and whether it would cause any agitation therein.

It was suggested by the president, that it might be tried, whether a magnet would operate at a farther distance in a thinner than a grosser air: and whether a very thick air would considerably lessen the force of its operation.

Mr. HOOKE moved, that experiments might be made to see, whether all hard bodies, that rebound, do not so upon the account of having springy particles in them; and that it might be inquired into, whether there be any body springy upon any other score, than that it has air in it.

He conceiving, that if there were to be had a body absolutely hard, and destitute of all springiness, it would not rebound at all, and it being said, that such a body would not be easily found for making the experiment, he answered, that it might be tried comparatively.

He took notice, that glass was capable of condensation and relaxation by pressure, and by taking off that pressure; and that the parts of glass may be put into a closer posture, because they contain air in them.

The bishop of CHESTER related to the society two experiments, which he had lately seen made at Exeter by Dr. THURSTON: one was of transfusion, in which they had caused a dog to be first weighed before the operation, and found his weight to be fifteen pounds and three ounces. Afterwards he was shut up tied for two or three hours, during which time he had spent in effluvia and otherwise about three ounces, as they found by weighing him again: then they let a sheep bleed into him so liberally, that the dog being weighed again after that transfusion was found to weigh seventeen pounds; whereupon he fell into a great disorder and agony, and died. Being opened, his heart was found full of coagulated blood, and the stomach black and bloody, and all his veins exceedingly distended; which could not but stop the free motion of the blood, and suffocate the animal.

The

The other experiment was, that after there had been found in the body of a person, who died of the stone in the kidneys, and was opened, great stones in the pelvis of each kidney, and in the parenchyma four white square stones. There was taken a dog, by the bishop's suggestion, and through one of his sides a wound made in the convex part of the kidney, and the place of the outward incision sewed up again, without applying any thing to the inward wound. Whereupon though the dog was very sick and feverish (doubtless from the extravasated blood, and refusing to feed for several days) yet he afterwards recovered. But it was thought proper to kill him a while after, to see, what alteration might have been made in that kidney, which was found quite healed up, so that no scar could be seen in it.

This experiment, in the bishop's opinion, might prove useful for the cutting men for the stone in the kidneys, as they are for that in the bladder. But it was observed by some members, that the stones in the kidneys being for the most part in the pelvis thereof, it was not at all probable, that a man could be cut so deep, as the pelvis, and not die.

Besides the experiment ordered above to be made at the next meeting, the following were likewise appointed: 1. That of Dr. DE GRAAF described in his book *de circum organis generationi intercurrentibus*, of unravelling the testicles, for which Dr. ALLEN, Dr. BALLE, and Dr. KING were desired to be curators, and to meet on the Tuesday following about three in the afternoon in Arundel-house. 2. The Macassar poison to be tried on a dog. 3. The cutting the kidney of a dog.

Nov. 5. At a meeting of the COUNCIL were present

The President

The lord BRERETON
The lord bishop of SALISBURY
The lord bishop of CHESTER
HENRY HOWARD of Norfolk

Mr. CHARLES HOWARD
Sir PAUL NEILE
Mr. HOSKYNs
Mr. OLDENBURG.

A committee was appointed to audit the accounts of this year, consisting of the president, Sir GEORGE ENT, Mr. HAYES, Mr. CREED, and Mr. OLDENBURG, and three of whom were to be a quorum. They agreed to meet on the 9th instant at six in the evening at the president's house.

The president was desired to take the opportunity of a privy-council day to speak with the lord privy-seal about the dispatch of the patent.

Mr. HOSKYNs was desired to speak with Mr. COLE, and to endeavour to get a sight of the writings, which Mr. COLE said, that he had obtained from all those, who pretended any title to Chelsea-college: and also to speak to Sir ANTHONY MORGAN's clerk for the papers of the society, that concerned the grant of the said college.

At the meeting of the SOCIETY on the same day,

MAURICE lord viscount FITZ-HARDING was admitted.

Mr. OLDENBURG read a letter from Dr. CHRISTOPHER WREN¹, in answer to what he had written to him, by order of the society, to request the communication of what Dr. WREN had done on the subject of motion: the substance of whose answer was, that he desired time to try over again some of his experiments upon that subject, and that he then hoped to give an account to satisfaction. This letter was ordered to be preserved.

The experiment of the Macassar poison was made upon a dog: the poison being mingled with some juice of lemon, the point of a knife dipt therein was struck into the fleshy part of one of the dog's hind legs, who appeared quite unaffected, when the society broke up.

Mr. HOOKE made an experiment of letting a feather fall in a glass-cane of about seven feet long with a head upon it; which being well exhausted, the feather fell down from the top to the bottom in about three seconds of time; but being again filled with air, the feather fell down in seven seconds and a half. Both experiments were repeated several times, with near the like effect.

Mr. HOOKE proposed the trying of experiments to determine the question concerning the communication of motion. For which purpose some trials had been made formerly² with three or more wooden balls, of which one of the lateral ones had been let fall against the middle-most, and impelled the other lateral one to the like height, from whence the first was fallen, so that the middle-most stirred but very little. He promised to prosecute these experiments at the next meeting by employing more balls, and letting the exterior ones fall against the intermediate.

Capt. SALTER³ was introduced and presented the society with a very curious piece of art, viz. the Queen's face turned with a turn-lathe by a medal. He said, that, if he had good medals of their Majesties, he would turn their faces much better, and intended to present the society with another piece, in case he should procure good medals to turn by; adding, that he would undertake to turn faces by a good picture, if he might but once well behold the original.

¹ The journal gives for the date of it October 26. but the Letter-Book, in which it is inserted, vol. ii. p. 303. has it November 3, 1668.

² See the minutes of Oct. 17, and 24, 1666.

³ of Norwich. He is recommended by NATH. FAIRFAX, M. D. to Mr. OLDENBURG in a letter dated at Woodbridge in Suffolk, January 29, 1667 (Supplement to the Letter Books, vol. iii. p. 196.) as *the most lucky turner in wood, ivory, and silver in Europe.* "He has now, adds Dr. FAIR-

FAX, an ivory cup by him of amazing workmanship, beautified, in the cover especially, "with flowers, and flower-pots of about fifty several makes (as I remember) all turn-work. "And a little while since I saw him pretty forward in turning the King's picture embossed, "as in the five pieces." In another letter of June 28, 1669, (ibid. p. 233.) Dr. FAIRFAX takes notice, that Capt. SALTER died some time before of a dropy in the pericardium.

Mr.

Mr. OLDENBURG acquainted the society, that he had received a letter, which signified to him, that Monfr. AUZOUT had made in Italy, where he was then travelling, an observation about the variation of the magnetic needle, and found, that it then varied there one degree and a quarter westward.

This made some members reflect on what Mr. HENRY BOND^a affirmed, that in this year 1668 the needle varied about London one degree and fifty six minutes westward: as also, that he had predicted how much the needle would vary for many years following, suitable to a certain hypothesis, which he held concerning the cause of that alteration.

It was thought desirable, that all such, as had conveniency, and were furnished with an apparatus, would endeavour either to verify or refute these predictions by the best and most accurate observations, which they could make on this subject.

Mr. OLDENBURG remarked farther, that Monfr. AUZOUT had met at Milan in the repository of Signor MANFREDO SETTALLA a little magnet weighing an ounce and a quarter, which Monfr. AUZOUT had seen take up seventy seven ounces, when it was held only in the hand, without any other fastening.

Mr. OLDENBURG likewise intimated, that Dr. WALLIS had mentioned in a late letter written to Mr. HEVELIUS, that on the 26th of October preceding he had begun to observe again the new star in Cete, which he had seen at a certain time of the year for many years past, anticipating every year about two or three and thirty days, according to BULLIALDUS's observation.

It was recommended to Mr. HOOKE and others, who could conveniently, to take notice of this phenomenon.

Notice was also given by Mr. OLDENBURG, that he had understood by a letter lately received, that at Paris they had begun, as Mr. TOWNLEY had done in England, to make good telescopicall glasses with a turn-lathe⁷.

Sir PAUL NEALE took occasion from hence to mention, that he had seen a short glass of CAMPANI's workmanship, brought out of Italy by Mr. NEVILL, which glass he thought very good. He was desir'd to endeavour to procure for the society a sight of that telescope, which he promised to do.

^a an intelligent mathematician and teacher of navigation, whose table of the variation of the magnetic needle is published in the Philof. Transf. vol. iii. n^o 4. p. 790, for Oct. 1668. Sir CHARLES CAYENDESSE, brother to WILLIAM marquis and afterwards duke of NEWCASTLE, in an original letter of his from Antwerp, Nov. 13, 1648, to Mr. JOHN PELL, then professor of mathematics at Breda, mentions Mr. BOND as an old mathematician at London, *an humble man*, who *"speaks, says he, very meanly of himself, and*

"yet he found an easy and short demonstration of that proposition concerning spherical triangles, which Mr. OUGHTRED demonstrated first, who told me, Mr. BOND's demonstration was "shorter." Sir CHARLES adds, that Mr. BOND was in hopes of finding the longitude by the load-stone; and his treatise on that subject intitled The longitude found was printed at London 1676, in 4to.

⁷ See Philof. Transact. n^o 40. p. 795.

The three following experiments were appointed for the next meetings, 1. About the propagation of motion. 2. That of Dr. DE GRAAF concerning the substance of the testicles. 3. Of cutting the kidney of a dog.

Nov. 12. The experiment of the communication of motion was tried by a contrivance, whereby three balls of the same wood, and of near equal bigness, were so suspended, that either of the two extremes being let fall from a certain height against the intermediate ball, the other extreme was impelled upwards to near the same height, from whence the first was let fall. that in the middle moving but very little; of which the president conceived this to be the reason, that the intermediate ball, when struck by one of the lateral ones, found the resistance of the other lateral ball; but this other lateral ball met with no other resistance than that of the air.

Mr. HOOKE was ordered to think upon other experiments for the making out this hypothesis about motion, which is, that no motion dies, nor is any motion produced anew.

Sir ROBERT MORAY moved, that bodies might be provided of several degrees of hardness, and of the same matter and weight, as steel bodies, and the like, to see whether the harder they are, the more they will rebound.

Others moved, that bodies might be provided, that had no springiness, or but little, to see, how much that quality contributed to the rebounding.

It was also moved, that since the society was upon the disquisition of the nature, principles, and laws of motion, all authors, who had written on that subject, and delivered their hypotheses concerning it, might be consulted and examined, and an account of their opinions brought in, to see, what had been already done in this matter. Whereupon Mr. COLLINS was desired to peruse such authors, and particularly DES CARTES, BORELLI, and MARCUS MARCI: And Mr. OLDENBURG was desired to write to Dr. WALLIS, that he would take a share of this work.

Mr. OLDENBURG read a letter from Monsr. HUYGENS, dated at Paris Nov. 13, 1668, N. S. in answer to what he had lately written to him by order of the society, desiring him, that if he did not yet think fit to print what he had discovered on the subject of motion, he would impart to them his theory of it, together with such experiments, as he grounded his theory upon. Monsr. HUYGEN's answer was, that he was ready to communicate to the society those rules and theorems, which he had found out in all the species of motion, not doubting but the society would secure to him the honour of that discovery, by giving it place in their Register-book, as coming from him. And as he desired to know of what part of motion the society would have him treat first, the secretary was ordered to acquaint him, that the society left that to his discretion, not doubting, but that he had treated that subject methodically; and therefore would begin with such particulars, as were simplest and clearest, giving light to what should follow. His letter was ordered to be entered in the Letter-Book *.

* Vol. ii. p. 311.

The curators for examining the testicles of animals made their report by the mouth of Dr. ALLEN to this purpose, that Dr. CLARKE, Dr. ALLEN, Dr. KING, and Mr. OLDENBURG had on the Tuesday preceding Nov. 10, met, and taken the testicles of a buck-rabbit and those of a dog, and having opened them, and put them into luke-warm water, found in all of them, that endeavouring to draw them out, they could not do it into any considerable length; and that those little short threads, which were drawn out, seemed not to have any firmness, like that of vessels in them, but were like a mucous or slimy substance, converted all into the water or slime, when rubbed upon the hand. That farther, what was drawn out was not like any unravelling, but resembled, as was just said, a viscous substance, first grosser and thicker, and then by extension made thinner and slenderer. Besides this, that one whole testicle of a dog (which had just been strangled) being put into luke-warm water, the greatest part of the body was washed away, there remaining only a small substance, that seemed to be membranous (which was produced by Dr. ALLEN dried up) and was sent to Mr. HOOKE to be viewed in a microscope, in order to see whether it was indeed a close membranous or a reticular body; and that Mr. HOOKE had found it to be membranous and close.

And since these experiments did not make out what Dr. DE GRAAF had asserted of the substance of the testicles, though they neither refuted it, as there might be vessels of so soft and delicate a texture, as to be dissolved into a watery body, for instance eels in vinegar, and the like; it was moved, that more experiments might be made about it, and particularly, that the testicles of larger animals, as boars, horses, &c. should be examined; as also that some injection should be made into the artery of the testicles; and that the same curators should be desired to prosecute these experiments, the operator being ordered to take their directions for providing all necessaries for that purpose.

It was likewise ordered, that a dog should be provided against the next meeting for the cutting of his kidney.

Sir PAUL NEILE acquainted the society with a relation, which he had received from Sir GILBERT TALBOT (who alledged Sir THOMAS STRICKLAND as the informant) concerning a strange disease of a poor man in Helderby in the county of York, who having a great swelling in his side, and that cut twice, it returning after the first opening and healing, there came out both times much corruption and a great quantity of bladders, some greater, some less, all full of matter; and that after the second cutting and healing up, the patient vomited up such bladders, and voided the like by his excrement and urine. It was added, that this account was communicated to the college of physicians in London, as the paper mentions, it was intended; and Dr. CLARKE mentioned, that he had been present at the college with some other physicians, when the paper was brought thither; and that it had been considered, but they had resolved nothing upon it. Sir PAUL NEILE was desired to give a copy of this relation, in order that it might be entered; which he declared himself willing to do.

Dr. BALLE produced some physico-mathematical propositions, sent from Italy, and published by Dr. DONATO ROSETTI, who pretended to demonstrate them; viz.

1. What is the true physical cause of æquilibriums?
2. That the notion of ARCHIMEDES, viz. that a floating body sinks so far under the level of the water, as that a mass of water equal to the part sunk weighs altogether as much, as the whole floating body, is false.
3. That it is very probable, that there is no æther; and consequently, that there is a very great vacuum.
4. That there is a very easy, short, and infallible way to know exactly, how great the full weight must be of the air, which is perpendicularly impending over a determinate place.
5. That with little less facility and brevity, and with the same certainty, may be weighed a part of the said air, as, for instance, a cubic yard.
6. The only way of measuring the height of the atmosphere.
7. How it may be experimented, whether the light, at the distance of forty or more miles, is moved in any observable time.

Dr. BALLE was desired, or any other member, who had conveniency, to write to Dr. ROSETTI, that he would first of all make good what he affirmed in his second proposition.

Mr. OLDENBURG produced a packet of curiosities sent by Mr. NORWOOD from the Bermudas, which packet had been thought to be lost, but was now retrieved. He produced also a letter and some rarities sent from Aleppo and Ispahan by the consul of the former, and the factor of the merchants at the latter. Both these were referred to the next meeting.

November 19. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
The lord bishop of CHESTER
The lord BRERETON
Sir PAUL NEILE

Sir JOHN LOWTHER
Mr. COLWALL
Mr. AERSKINE
Mr. OLDENBURG.

The committee of the council for examining the accounts of the society for this last year made a report, which was approved of, as follows:

" At a committee of the council of the Royal Society for auditing the treasurer's accounts, November 9, 1668.

2

" Upon

“ Upon examination of Mr. COLWALL's accounts we find him debtor

	l.	s.	d.
“ To the arrears due to the Royal Society for their quarterly } “ payments, this 9 Nov. 1668. ———	1102	6	6

“ To monies he hath received for admissions ———	29	10	6
--	----	----	---

“ To the balance of his last account in money ———	77	15	5
	1209	12	5

“ We also find him creditor

“ By the monies he hath paid for the use of the Royal Society } “ by order of the council ———	264	5	5
---	-----	---	---

“ By money in arrear resting unpaid by the fellows of the society	847	1	6
---	-----	---	---

“ By balance resting in cash now in his hands ———	98	5	6
	1209	12	5

“ And in the cash-chest of the Royal Society the sum of one hundred pounds.

BROUNCKER, P. R. S.

J. A. HAYES.

HENRY OLDENBURG, Sect.

Mr. OLDENBURG read a letter from the vice-chancellor of the university of Oxford * to Mr. BOYLE, importing, that he would endeavour to procure an exchange of the manuscripts now in the possession of the society, for such books as were proper for their purpose. The consideration of which was referred to another meeting of the council, where HENRY HOWARD might be present.

Upon the desire of Sir PETER WYCHE, that the society would license their printers to print a translation made by him at the request of the society, of a manuscript in the Portuguese language concerning the Nile, the Unicorn, the Red-sea, PRESTER JOHN, and the variety of palm-trees, the council granted their license to the printers for printing that translation.

Dr. BALLE and Mr. COLLINS were desired with Mr. HOOKE to expedite the catalogue of the Arundelian library.

At a meeting of the SOCIETY on the same day,

Sir KINGSMILL LUCY, knt. and bart. DANIEL FINCH, Esq; † and Mr. JOHN

* JOHN FELL, D. D. Dean of Christ church.

† Son of Sir HENEAGE FINCH, and afterwards earl of NOTTINGHAM.

LOOKE were propofed candidates, the two firft by the bifhop of CHESTER, and the third by Sir PAUL NEILE.

The prefident, according to ftatute, nominated five of the fellows of the fociety to be a committee for auditing the accounts of this year, viz.

Sir THEODORE DE VAUX
Dr. GODDARD
Mr. BALLE

Dr. KING
Mr. COLLINS.

Mr. OLDENBURG produced the curiofities fent from the Bermudas by Mr. NORWOOD and Mr. STAFFORD, which he had lately retrieved, after having been miffing for feveral weeks, the captain of the fhip, to whom they had been recommended, not remembering what was become of them. The particulars were, 1. Cedar-berries. 2. Palmetto-berries. 3. Oil-feeds or Palma-Chrifti-feeds, 4. Poifon-weed. 5. Silk-spider's webs. Some of thefe berries and feeds were ordered to be given to Mr. CHARLES HOWARD, Mr. EVELYN, and fuch others, as had the conveniency of planting them, to fee how they would thrive in England.

Mr. OLDENBURG was defired to inquire in his answer to Mr. NORWOOD and Mr. STAFFORD, whether they themfelves had feen any of thofe fpiders work, whom they defcribed as making their webs between trees feven or eight fathom diftant; and to defire them to fend fome of thofe huge leaves mentioned in their letter; and to affure them, that the expences of what they fhall fend to the fociety fhall be fatisfied.

Mr. OLDENBURG produced and read a letter to him from Mr. LANNoy, conful at Aleppo, dated there July 6, 1668, giving an account to the fociety of what Mr. STEPHEN FLOWER, the agent for the Englifh Eaft-India company in Perfia, had done there, in order to fatisfy the queries formerly fent thither, and particularly thofe concerning the ruftina and the ruins of Perfeopolis. Mr. LANNoy's letter was ordered to be entered into the Letter-Book, as follows ^d:

“ Honoured Sir,

“ **T**HE fifth of Auguft laft I gave you the trouble of a few lines, and inclofed the answer to the paper of inquiries you fent me; fince which, I have received feveral letters from Mr. STEPHEN FLOWER, who is agent for the affairs of the honourable Eaft-India company in Perfia, to whom, by your order, I fent a copy of thefe papers, which you fent me.

“ To the 12th inquiry, whether any ruftina is to be found in Perfia, and how ufed, he answers, that what is meant by ruftina, is called by the Perfians, *zer-nick*, the French, *orpiment*, the Portugals, *fezador*. It is a kind of mineral, a mufter whereof I herewith fend, both crude and ground; it comes from Cofbein,

* Mr. OLDENBURG's answers to Mr. STAFFORD entered in the Letter-Book, vol. ii. p. 316 and 319. and Mr. NORWOOD, dated Nov. 16, 1668, are “ Letter-Book, vol. ii. p. 250.

“ where

“ where quantities are procurable, and is used by the Persians only in their bag-nios, as in Italy, and painting as in England and France. It costs in Persia three abesses or four shillings the mandshaw of twelve pounds, and that, which is in lump, four pence leis. With the French it is a great commodity. There is also another mineral much like it, but more ponderous, called by the Persians *mordejang*, or the stone of death, which comes from Kirman; being inwardly taken is rank poison (as is the other) and is of a contrary nature to the other, because cold; used outwardly both here and in India to take away all manner of heats under the arms and other parts, being ground upon a stone; a mulster whereof I send herewith; and is sold for five abesses the mandshaw, which is about six pence the pound.

“ If either of these be that drug, which is called *rusma*, you may have what quantity you please sent you.

“ To your query about the pictures and bas-reliefs at Persepolis and Chimilnar, he answers, that at present there are no draughts extant; he had seen one taken by a Padre Carmelitan about four years since, who went for Rome, but very imperfect. In anno 1661, in company of agent BUCKRIDGE, who is now in England, M. FLOWER took a view of that piece of antiquity, which at present is so greatly defaced by time, that there is hardly any thing discernible: however in compliance to the desire of the Royal Society, which he esteems as a command, he hath found a person skilful in the faculty of limning, and painting, a Polonese by nation, an ingenious person, who hath served the Kings of Persia these 30 years, whose license he hath procured, and contracted with him for 200 dollars, to accompany him to Chilmanar, and to take the draughts, which are most remarkable; and at his return to Spahane to put them in colours.

“ The 22d of November they arrived at Chahelmanar, alias Persepolis, and went to the mountains called Norturestand, to the westward of Persepolis a good league, where they took the several draughts of the four tombs, where the antient kings have been interred. They are all within a stone's cast of each other, of the same form and work, carved out of the main rock of greyish marble; and although some are more perfect and less defaced by time than others, yet it is hard to judge which is more antient; their height, and breadth, and length equal.

“ A little distance to the westward of those tombs is about twenty foot from the ground cut out of black marble, in the said mountain, two horſes with their riders, which are supposed to be ALEXANDER, and RUSTRAM, a mighty man of the Gours, or Gabres, (of whom the Persians have many stories) who are contending for a ring of iron, which each have hold of. On the thigh of each horse before are engraven some characters, which he endeavoured, as many as were discernible, exactly to set on a paper, being only two lines; as also of another antient character, by none legible at this day. Part of each whereof I send you here enclosed: the last character being written at Persepolis in no
“ leis

" less than 20 several places of black marble within and without, in a quadrangle
 " not above ten yards distance any ways; not one of them being intirely perfect,
 " but all more or less defaced by time and malice.

" After which they went to Persepolis, now called *Meer Cossoun*, and there
 " both without and within they began to take the several draughts, which the
 " limner thought to have performed only at a distance, but M. FLOWER did not
 " approve of that, being resolved to take the exactest draughts, that hitherto hath
 " been taken, which the limner, perceiving Mr. FLOWER's resolution, was desirous
 " to be excused of the contract. But Mr. FLOWER having taken so much pains,
 " encouraged him to proceed, which will take him up, before he will be able to
 " finish it, at least twelve months time, which he hopes, when finished will ap-
 " pear an excellent work, and acceptable to all that shall see it. He hath supplied
 " the limner with money, a horse, and a servant, that, after that he hath taken
 " the exact draughts, he may return to finish the work at Spahaune, where M.
 " FLOWER expects an order for the sending of the said draughts, &c. whether by
 " sea or land for its greater security, and least damage, desiring to know, when
 " the work is perfected, what order will be taken for his reimbursements.

" To the other inquiries he hath not returned any answer, but promiseth to do
 " it. I humbly crave leave, and remain

" S I R,

Aleppo, July 6,
 1668.

" your humble Servant,

" BENJAMIN LANNON."

It was ordered, that the specimens of the curiosities accompanying this letter, viz. some rusma both crude and ground, and another substance, called mordefang or stone of death, said to be a rank poison, when taken inwardly, be put into the repository: And that as to the draught of the pictures and bas-reliefs of Persepolis, Mr. FLOWER should be informed, that since that could not be made but with great charge, the society would not give him any further trouble about it, especially as those things did not contribute to their main design, and their revenues was not so considerable as to enable them to be at great expences.

Mr. OLDENBURG produced a paper from Capt. SAMUEL STURMY, containing an account of some observations made by him this year in Hongroad, four miles from Bristol, about the tides, by way of answer to the queries on that subject proposed in N^o 17 and 18 of the *Philosophical Transactions*. The paper was read and ordered to be entered; and the author was desired to continue his observations, especially those of the annual spring-tides, viz. whether they are precisely at the full and change of the equinoxes, or a little before and after them; as also those,

* Mr. OLDENBURG's answers to Mr. LANNON and Mr. FLOWER, dated Nov. 21, 1668, are entered in the Letter-Book, vol. ii. p. 328 and 330.

† Register, vol. iv. p. 21. It is printed in the *Philos. Transact.* vol. iii. n^o 41, p. 813, for November 1668.

that

that relate to the degrees of the increase of the tides, whether indeed the velocity be greatest at first, as he affirmed to have been observed this year, or whether it increases till mid-water, and then gradually decreases again.

Mr. OLDENBURG acquainted the society, that he had lately received from Mr. RICHARD KEMP, an English gentleman, then living at Seville, an account of some observations made by him in the kingdom of Mexico, chiefly about the mines, and the separation of them, in those parts; the reading of which was deferred till the next meeting.

Dr. KING related, that he had prosecuted the experiment about the substance of the testicles, and shewed the society some of those of a buck-rabbit, which seemed indeed to several of the members to be made up of vessels, lying in little round folds in a kind of uniformity, through the whole substance, and resembling little guts to the sight; thought by the doctor to be tubular, and wrapt about with a very fine and curious embroidery of other vessels, which he supposed to be veins and arteries, on account of the apparent redness in them. He was desired to bring in the full account of it in writing; and the committee appointed for these observations was desired to pursue them.

The experiments appointed for the next meeting were 1. Of motion, 2. Of cutting a dog's kidney.

November 23. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY

The lord bishop of CHESTER

The lord BRERETON

Mr. CHARLES HOWARD

Sir ROBERT MORAY

Sir PAUL NEILE

Sir JOHN LOWTHER

Sir GEORGE ENT

Mr. COLWALL

Mr. HOSKYNs

Mr. OLDENBURG.

It was ordered, that Mr. HOSKYNs be desired to prepare a draught for finishing the business of the society with Mr. COLE:

That the following persons, viz. the president, the bishops of SALISBURY and CHESTER, the lord BRERETON, Sir ROBERT MORAY, and Sir PAUL NEILE, be desired to confer with the lord privy-seal concerning the terms, upon which his lordship will pass the additional patent of the society: And

That the president be desired to try by a letter to Mrs. MORE, whether she will deliver the papers, left with Sir ANTHONY MORGAN, concerning the affairs of the society.

November 26. At a meeting of the SOCIETY,

EDWARD

EDWARD HOWARD, esq; was admitted.

PETER COURTHOPE, esq; was admitted.

SIR KINGSMILL LUCY, was elected.

Mr. LOCKE was elected and admitted.

DANIEL FINCH, esq; was elected.

EDWARD CHAMBERLAYNE, esq; was proposed candidate by Mr. EVELYN.

The experiment devised and made this day by Mr. HOOKE was the impelling of wooden balls against both springy and not springy bodies, whereby he intended to evince, that the reflection of motion depends upon the springiness of bodies; so that where there is no spring, there can be no reflection.

But the experiment made not being satisfactory to the society for the purpose declared, Mr. HOOKE proposed another to be made at the next meeting, viz. with a metalline string made more or less true, to see what the returns or reflections of it will be, according to its several degrees of tension.

Dr. CROUNE suggested, that it might be considered, whether the business of motion might not be made out without taking in the notion of the springiness of bodies.

Mr. OLDENBURG produced a paper of Dr. WALLIS, written by him Nov. 15, 1668, at Oxford, concerning the general laws of motion; which was ordered to be registered^f.

Dr. KING gave an account of the progress made by him in the examination of the substance of the testicles, and that he was confirmed in what he had said of it at the last meeting.

Dr. CLARKE affirmed, that the notion of it had been started in England thirty years before by Dr. READ^g; and that Dr. THOMAS WHARTON in his *Adenographica seu Descriptio Glandularum totius Corporis*^h had remarked, that the testicles were a *Congeries Fibrillarum*; though he, Dr. CLARKE, did not yet see, that the whole substance of that part should be nothing else but vessels, since a good part of it would dissolve into water by a slight rubbing it; and since also it was necessary, that there should be, besides vessels, something intermediate for separation.

^f It does not appear in the Register, but it is printed in the *Philos. Transact.* vol. iii. n^o 43, p. 864, for January 1663.

^g ALEXANDER READ, a Scotsman, who was

created doctor of physic at Oxford, May 29, 1620, was afterwards fellow of the College of Physicians at London.

^h Printed at London, 1656, in 4^o.

It was ordered, those members, who had already begun to examine this subject, should be desired to prosecute it, and particularly try what they could find in the testicles of a boar or an horse: Upon which Dr. ALLEN said, that he intended to inject some liquor through the aorta into the artery of the testicles of a horse, to see what inflation there would follow in the pretended vessels of that part.

Dr. ALLEN mentioned likewise, that he intended to open an old dog, broken-winded, to view the parts for respiration; and that he would also look into the kidneys of the same dog; it being believed, that old dogs commonly have stones in their kidneys, and often die of them.

It was agreed upon, that the committee for anatomical experiments should meet on the Saturday following at Mr. Hooke's lodgings in Gresham-college, in order to make an incision in the kidney of a dog, and to observe, whether it would heal up again.

Mr. OLDENBURG communicated a letter to him from Mr. COLEPRESE dated at Leyden Nov. 20, 1668, accompanied with some facitious opal, made by rule at Delft, together with several pieces of glasses, shewing the different degrees, through which the glass passes, before it becomes opaline; and a small piece of red glass, the method of making which had been lately discovered again in Holland, according to this letter, which was ordered to be preserved^a.

Mr. OLDENBURG produced likewise a letter dated at Seville, August 28, 1668, and some papers of observations made in Mexico, sent to him by Mr. RICHARD KEMP from Seville. Some particulars of these papers being read, viz. concerning a kind of leaf gold found plentifully on the roof of a cave near Mexico, and the whole method of separating silver from the ore by mercury, it was ordered, that they should be preserved upon the file^b, and Mr. KEMP the author be desired to continue his communications.

November 30. Sir KINGSMILL LUCY was admitted.

The committee for auditing the accounts of the society made their report, viz.

" At a committee of the Royal Society for auditing the treasurer's accounts,
" Nov. 26, 1668.

" Upon examination it appeareth,

	l.	s.	d.
" That the treasurer hath received in the quarterly payments of	255	5	0
" the society			

^a Supplement to the Letter-Books, vol. ii. p. 253.

^b The letter is entered in the Supplement to the

Letter-Books, vol. v. and part of the papers printed in the Philos. Transact. vol. iii. n^o 41. p. 817. for November. 1668.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" That he hath received more for admissions	29	10	6.
" That he is debtor to the balance of his last account, made up } Nov. 11, 1667.	77	15	5
" It also appeareth,	362	10	11
" That he hath paid to the use of the society, as by bills and } " orders	264	5	5.
" That he hath now in money resting in his hands ninety eight } " pounds, five shillings and six pence. We say,	98	5	6.
	362	10	11

" THEODORE DE VAUX
WILLIAM BALLE J. GODDARD
EDMUND KING.

There was presented to the society from Mr. BOYLE his book, intituled, *A Continuation of new Experiments physico-mechanical touching the Spring and weight of the air* ^a.

SIR ROBERT MORAY produced a present sent to the society by Sir PHILIBERTO VERNATTI from Batavia in Java Major, consisting of

1. A very fragrant and aromatic oil, drawn out of a bark of a tree called *Laway*, a piece of which was sent with the oil.
2. Some of the true oil of mace, pressed as soon as it was separated from the nutmeg.
3. Beans growing on the coast of Coromandel, having the virtue of clearing the most muddy water, were mentioned with the other things, but were missing.
4. A piece of wood called *garou*, a sort of *aquila*.
5. Some of the blood of a fish called *bedille*, esteemed excellent against fluxes.

These things were delivered to Mr. HOOKS for the repository; but the reading of the paper describing them was referred to the next meeting.

The society, of whom sixty fellows were present, proceeded then to the election of a new council and officers.

^a Printed at Oxford, in 4°.

Of the old council were continued these eleven,

The lord Brouncker
The lord viscount BRERETON
The lord bishop of SALISBURY
The lord bishop of CHESTER
HENRY HOWARD of Norfolk
Mr. AERSKINE

Sir ROBERT MORAY
Sir PAUL NEILE
Sir GEORGE ENT
Mr. COLWALL
Mr. OLDENBURG.

Out of the society were chosen into the council, these ten

The earl of SANDWICH
The lord BERKLEY
Sir GILBERT TALBOT
Sir THEODORE DE VAUX
Mr. EVELYN

Mr. HENSHAW
Dr. GODDARD
Dr. CLARKE
Dr. CROUNE
Dr. POPE.

The officers elected were

The lord viscount Brouncker, president
DANIEL COLWALL, esq; treasurer
THOMAS HENSHAW, esq; } secretaries.
HENRY OLDENBURG, esq; }

Of the ten new members of the council were now sworn Sir GILBERT TALBOT, Sir THEODORE DE VAUX, Mr. HENSHAW, Mr. EVELYN, Dr. GODDARD, and Dr. CLARKE, the rest being absent.

Mr. HENSHAW was also sworn secretary, being chosen in the place of Dr. WILKINS, now lord bishop of Chester.

December 3. Mr. CHAMBERLAYNE was elected and admitted.

Sir JOHN BANKS, bart. was proposed candidate by Dr. GODDARD.

The present sent by Sir PHILIBERTO VERNATTI was opened; and the paper describing the particulars, as also an answer to some queries, were read; both which were ordered to be registered¹, and a copy of the description of the curiosities to be given to Mr. HOOKE, to be kept together with them in the repository.

It being, among the answers to the queries, affirmed, that the answerer himself had seen an amphibian with two heads, Dr. POPE and Mr. HOOKE said, that Sir ANDREW KING had seen divers of them in Spain. Whereupon the secretary was desired to write to Sir WILLIAM GODOLPHIN from the society, and to desire him to takenotice of this animal, when he should be arrived in that kingdom.

¹ Register, vol. iv p. 25 and 27. They are printed in the Philos. Transact. vol. iii. L^a 43, p. 863, for January 1663.

MR. OLDENBURG produced a letter to the president from Dr. WALLIS, dated at Oxford, November 4, 1668, wherein was stated the whole controversy betwixt Monfr. HUYGENS and Mr. GREGORY concerning the book intitled, *Vera Circuli et Hyperbolæ Quadratura*, published by the latter. Part of it being read, and the president having signified, that the whole, though too long to be read then, was considerable, and very fit to be kept among the society's papers, it was ordered to be entered into the Letter-Bookⁿ.

Dr. KING gave an account of the experiment made upon an old dog by cutting his kidney through in such a manner, that he thrust a probe into the ureter; whereupon the dog fell, as it were, into a swoon, but recovered, and, the wound being sewed up, walked up and down.

The operator was ordered to take care of this dog; and it being mentioned, that this animal was wind-broken, it was moved, that, if he should die, he might be opened, and his lungs examined; which, in case he died, was ordered to be done.

MR. OLDENBURG read an extract, which he had received from Paris, signifying, that it was most certain, that Dr. DE GRAAF had unravelled testicles, and that one of them was kept by him in spirit of wine.

Some of the physicians present intimating, that the like had been attempted in England many years before, but not with that success, that they could yet believe what Dr. DE GRAAF affirmedⁿ, Dr. KING expressed his hopes of making out that point in a short time.

There was attempted the experiment to shew, that rebounding was caused by springiness, with a brass-wire more or less tense. But the apparatus being defective, it was ordered, that the experiment should be repeated at the next meeting.

The physicians appointed to examine the structure of the testicles were desired to prosecute that subject, that they might give an account of it at the next meeting.

It was moved, that Mr. BOYLE's *Continuation of new experiments physico-mechanical*, lately presented to the society, might be perused by some of the members,

ⁿ Vol. ii. p. 303.

ⁿ A controversy was carried on for some time on this subject by letters in Latin addressed to Mr. OLDENBURG by Dr. DE GRAAF and Dr. TIMOTHY CLARKE, and extant in the 2d and 3d volumes of the Supplement to the Letter-Books of the Royal Society. Dr. DE GRAAF's first letter is dated at Delft, October 5, 1668, vindicating his discovery of the texture of the testicles against the objections of Dr. CLARKE and others, vol. iii.

p. 410. Dr. CLARKE's answer is dated December 20, 1668, vol. ii. p. 272. Dr. DE GRAAF replied Feb. 22, 1668, vol. iii. p. 414. Dr. CLARKE rejoined May 10, 1669, vol. ii. p. 275, which occasioned a letter of Dr. DE GRAAF of the 25th of July following, vol. iii. p. 420. Dr. CLARKE wrote on the 20th of December that year a letter, vol. ii. p. 282, recapitulating and clearing the dispute, which Dr. DE GRAAF seemed to close by one dated June 27, 1670, vol. iii. p. 428.

and

and an account given of it to the society : whereupon Mr. Hooke having the book in his hands was desired to do this.

Decemb. 10. Sir JOHN BANKS was elected.

The experiment devised by Mr. HOOKE, to shew, how rebounding depends upon the springiness of bodies, was made by a springy plate of brass, bent in the form of an oval ; which being cut or burnt asunder reflected two wooden balls of different sizes ; so as that they were conceived to move in reciprocal proportion to their magnitudes. The experiment was ordered to be prosecuted at the next meeting.

Dr. KING brought in a human testicle unravelled, and thus glued on a glass. He was desired to bring in the process of his operation in writing, which he promised to do.

Mr. HOOKE informed the society, that Dr. ALLEN had examined the testicles of a horse, and found them to be made up of vessels.

The dog, whose kidney had been cut through to the very ureter, was produced, and found pretty well, and was said to eat, go about, and bark ; which last he had not been heard to do a great while before.

Mr. OLDENBURG communicated three letters ; one from Mr. HEVELIUS, another from Signor MALPIGHI, and the third from Dr. WALLIS. The first, dated November 20, 1668, N. S. gave an account of the late horizontal eclipse of the moon on the $\frac{7}{11}$ November, 1668 *. The second in Latin, dated at Bologna, April 1, 1668 †, sent by sea with two books, one written by Signor MALPIGHI himself, intitled, *De Viscerum Stru&u&la Exercitatio anatomica*, printed at Bologna 1666, in 4to ; and the other intitled, *Pensieri Physico-matematiche sopra alcune esperienze fatte in Bologna nell' academia philosophica intorno diversi effetti de' liquidi in carnicie di vetro &c. dal dottor Gemminiano Montaneri*. Signor MALPIGHI's letter shewed his regard for the society, and his readiness to correspond with it, and to communicate to it philosophical matters. The third letter, that of Dr. WALLIS, dated Decemb. 5, 1668 ‡, contained an answer to some queries proposed by Mr. WILLIAM NEILE, viz. 1. Whether quiescent matter have any resistance to motion. 2. Whether motion may pass out of one subject into another. 3. Whether no motion in the world perish, nor new motion be generated. 4. Whether different motions meeting destroy one another. These three letters were ordered to be entered in the Letter-Book.

Mr. COLWALL produced a letter from Mr. HOBBS to Mr. BROOKES, dated at Chatworth, October 20, 1668, concerning a young woman at Overhaddon in Derbyshire, who had lived without any meat or drink since March preceding †. It was as follows :

* Letter-Book, vol. ii. p. 325.

† Ibid. p. 356.

‡ Ibid. p. 344.

† Letter-Book, vol. ii. p. 286.

“ Sir

" Sir,

" **T**HE young woman at Overhaddon hath been visited by divers persons of this house. My lord himself hunting the hare one day, at the town's-end, with other gentlemen and some of his servants, went to see her on purpose; and they all agree with the relation, you say was made to yourself. They further say on their own knowledge, that part of her belly touches her back-bone. She began (as her mother says) to lose her appetite in December last, and had lost it quite in March following, inasmuch, as that since that time she has not eaten, nor drank any thing at all, but only wets her lips with a feather dipped in water. They were told also, that her guts (she always keeps her bed) lie out by her at her fundament, shrunken. Some of the neighbouring ministers visit her often; others, that see her for curiosity, give her money, sixpence or a shilling, which she refuseth, and her mother taketh. But it does not appear they gain by it so much, as to breed a suspicion of a cheat. The woman is manifestly sick, and it is thought she cannot last much longer. Her talk (as the gentlewoman, that went from this house, told me) is most heavenly. To know the certainty, there be many things, that are necessary, which cannot honestly be pried into by a man. First, whether her guts (as it is said) lie out. Secondly, whether any excrement pass that way, or none at all. For if it pass, though in small quantity, yet it argues food proportionable, which may, being little, be given her secretly, and pass through the shrunken intestine, which may easily be kept clean. Thirdly, whether no urine at all pass, for liquors also nourish as they go. I think, it were somewhat inhumane, to examine these things too nearly, when it so little concerns the commonwealth; nor do I know of any law, that authoriseth a justice of peace, or other subject, to restrain the liberty of a sick person, so far as were needful for a discovery of this nature. I cannot therefore deliver any judgment in the case. The examining, whether such a thing as this be a miracle, belongs (I think) to the church. Besides I myself in a sickness have been without all manner of sustenance, for more than six weeks together; which is enough to make me think, that six months would not have made it a miracle. Nor do I much wonder, that a young woman of clear memory, hourly expecting death, should be more devout than at other times: it was my own case: that, which I wonder at most, is, how her piety without instruction should be so eloquent, as it is reported, &c.

" Chatsworth, Oct. 20, 1668."

Mr. Hooke acquainted the society, that he had lately made an observation of one of the eclipses of Jupiter by the satellites, and that it had happened at the very time, assigned by CASSINI in his *Ephemerides Medicorum*.

He moved, that Mr. OLDENBURG might be desired to write to CASSINI, to learn, whether he had calculated other ephemerides of any year to come; and if so, to request him to communicate them, in order that observations might be made in England as well as Italy, to find out the precise difference of meridians. Mr. OLDENBURG accordingly undertook to write to him for that purpose.

December 17. At this meeting were present two Italian gentlemen, the marquis RICARDI, and Signor ALEFRANDRO SEGNI, both introduced by Count URALDINO. They acquainted the society of the singular respect, which the Cardinal LEOPOLD DE MEDICIS had for them, and that he desired to have his excuse made for not having himself returned his acknowledgments for the *History of the Society* sent to him, which he had been hindered from doing by his lately received dignity of Cardinal; but that since that time he had desired and already obtained the Pope's permission to correspond with the society, of which he now intended to make use, to let them see the esteem, which he had of them and their institution.

The president thanked these gentlemen for acquainting the society with so favourable an inclination of his Eminence to them, and desired them to assure him of the deep sense, which the society had of his favour to them, and that they would study to entertain so noble and promising a correspondence with all reciprocal services, that might be acceptable to his Eminence.

An experiment was made in prosecution of the motion, that springiness is the cause of rebounding; viz. a wooden globe was let fall against wood, a gut-string, and a brass-wire. In the first case the rebounding was languid, and of a very short duration: in the second, it was much stronger, and more durable: in the last, strongest and most durable of all. Which was conceived to proceed from the different degrees of the force of the spring in the several bodies employed.

Mr. HOOKE took occasion to mention, that he thought, that air, next to quicksilver, gave the quickest and most forcible reflexion; and that the sparkling of diamonds in rings proceed from the air left behind the stones.

Dr. WREN produced his theory of the collision of bodies, together with some papers containing the various trials made long before to verify that theory. It was read, and ordered to be registered; the author affirming, that he had this hypothesis several years before, when the society began to be formed; and that Mr. ROOKE and himself made divers experiments before the society to verify the same: which affirmation of his was seconded and confirmed by several of the members, who were eye-witnesses of those experiments, as the president, Sir PAUL NEILE, Mr. BALLE, and Mr. HILL.

Mr. HOOKE was ordered to take care, that the experiments be made before the society, to verify the several cases relating to the theory produced.

He was desired to bring in what he had considered of the cause of springiness.

Dr. ALLEN reported, that the dog, whose kidney had been cut by Dr. KING, being dead, by being misused, as he thought, after the operation, he had opened him, and found that kidney in good part well united again, yet with some *pns* in

* Register, vol. iv. p. 29. It is printed in the *Philos. Transact.* vol. iii. n^o 43. p. 867, for January, 1663.

it; and that viewing his lungs, because he had been broken-winded, he saw no defect in them.

Dr. ALLEN and Dr. KING were desired to bring in writing an account, the one of the operation in cutting the kidney, the other of what was observable in it and in the lungs, after the dog was dead.

Mr. OLDENBURG produced a letter to him from Mr. HEVELIUS, dated at Dantzick, November 29, 1668, N. S. giving an account of the late eclipse of the sun, November 4, N. S. as also the description of an engine, *que*, to use his words, *beneficio perpendiculari, loco indicis, regulam cum dieptivis perpetuam & satis exacte ad solem stellasque fixas obvertit*. This letter was ordered to be entered in the Letter-Book.

Dr. KING communicated his written account of the testicles, which was read, and ordered to be registered.

It was ordered, that the operator should provide a lusty dog to repeat the experiment of cutting the kidney; and that the curators of the former experiment of this kind should be desired to take care likewise of this.

Dec. 24. The SOCIETY did not meet.

Dec. 31. Sir JOHN BANKS was admitted.

The operator being out of town, the experiments appointed for this meeting were deferred till the next.

Dr. WREN produced a vessel contrived by himself to cure smoaking chimneys, which he affirmed had proved very effectual by divers trials. It was delivered to Mr. HOOKE for the repository.

Mr. OLDENBURG produced a manuscript lent him by one Monsr. MURALT of Switserland, containing a considerable number of plants, which himself and some other curious persons of his country had found and collected in the Helvetian Alpes.

Mr. HAAK brought in from Monsr. MURALT an account in Latin of the generation of crystals on the Alpes, which was read.

It was ordered, that Monsr. MURALT be desired to give leave, that a copy of the plants might be taken, and that the paper about crystals might be kept on the file.

Mr. OLDENBURG read a Latin letter to himself from Sir WILLIAM CURTIUS, dated at Umbstad, December 2, 1668, containing assurances of his willingness to

¹ Vol. II. p. 332.

² Register, vol. iv. p. 39. It is printed in the Philos. Transact. vol. iv. n^o 52. p. 1043; for Oct. 1669.

send what philosophical communications he could out of Germany, and particularly from the Elector of Mentz and from the physician of the Landgrave of Hesse-Darmstadt. This letter was ordered to be entered in the Letter-Book ^a.

Mr. OLDENBURG communicated likewise a letter written to him by EDWARD BROWN, M. D. from Vienna, December 6, 1668, containing his desire to be employed in philosophical matters for the society's service in Germany, Hungary, the Moravia, &c. It was ordered, that this letter be entered in the Letter-Book ^a, and the writer of it desired to endeavour to procure a good account of the mines of Germany and Hungary, and particularly of the gold-mines of Hungary, and to bring over some of those mineral veins, which have perfect gold in them; as also some of the best Hungarian vitriol.

It was moved, that some experiments might be made with pendulums in an exhausted receiver, to see, what difference there is between their motion in such a receiver, and in the open air: as also to make trial, whether motion could be made quite to cease.

Mr. HOOKE affirmed, that he conceived, that the impediment given by the air or other fluids to moving bodies decreased in a continual proportion: which the president desired might be made out by experiment.

January 7, 1669. Col. TILAS TITUS was proposed candidate by the bishop of CHESTER.

Mr. OLDENBURG produced a letter to him from Monfr. HUYGENS dated at Paris, Jan. 9th, 1669, N. S. and accompanied with some papers of his concerning motion. This letter and the other papers being read, it was ordered, that the former should be entered in the Letter-Book, and the latter in the Register ^a: as also that copies should be made of those papers, and given to such members of the society, as had considered that subject, viz. the president, the bishop of SARUM, Dr. WALLIS, Dr. PELL, Dr. WREN, Mr. NEILE, Dr. CROUNE, and Mr. HOOKE.

Sir PAUL NEILE moved, that Dr. WREN's hypothesis of motion, brought in December 17, 1668, might be printed in the *Philosophical Transactions* of this month, which motion was approved, and Mr. OLDENBURG desired to take care, that it be done accordingly ^a.

Mr. HOOKE made an experiment to prove, that the strength of a body moved is in a duplicate proportion to its velocity. But the experiment not succeeding, by

^a Vol. ii. p. 341.

^b Supplement to the Letter-Books, vol. ii. p. 101.

^c The copy of this letter in the Letter-Book, vol. iv. p. 10. has the date January 5.

VOL. II.

^a Book iv. p. 31. They are printed in the *Philos. Transact.* vol. iv. n^o 46. p. 925. for April, 1669.

^b It is printed in the *Philos. Transact.* vol. iii. n^o 43. p. 867. for January, 1669.

X x

reason

reason (as was supposed by Mr. Hooke) of the frost disordering the instrument employed, it was ordered to be repeated at the next meeting.

He shewed a way, whereby a segment of a spherical glass may be made to magnify the object to the very edges, and so to perform the effect of a conic section. It was observed by several of the members, that it succeeded accordingly, it being performed by means of water poured upon the spherical glass. Mr. Hooke was desired to shew it again at the next meeting.

Dr. KING brought in his written account of the cutting the kidney of a dog; which was ordered to be registered^c; and he was desired to make the experiment upon another dog, that was young and healthy. The account was as follows:

"December 3, 1668. I opened the side of a dog, that was said to be twenty years old, broken-winded, and could not bark nor hardly go. The intent was, to draw out the kidney, and see if there were any stone in it; if not, to put it in again, and see if it would heal up again. The manner of the operation was thus; I tied the dog in a convenient posture upon a form, who perfectly swooned, and seemed dead before touched with a knife: then I made a little hole into the cavity of the belly, just against the right kidney, as near as I could guess; then I carefully took out the kidney at the orifice, and cut through the whole length of the kidney to the pelvis; then I opened it, one half, one way, the other, the other way; and put my finger into the pelvis, and a probe into the ureter; then I gave the kidney another oblique cut towards the end, and when I had done so, I returned the kidney into its place again, and so sewed up the orifice. This Dr. POPE and others saw me do, as I have here related, and in the same manner: the dog lived ten days after, and had recovered strength strangely, breathed better, and could bark, &c. as I was informed; till he received a new hurt, which is thought killed him; and afterwards was dissected by Dr. ALLEN, who found the kidney near wholly united again, and I suppose will give in his observations."

Mr. OLDENBURG read two letters to him by Mr. HEVELIUS, one dated Nov. 29, 1668, come by sea, containing his observations of the late solar eclipse, Nov. 4, 1668, N. S. the other *ipsa die solstitii brumalis*, 1668 (as he expressed the date) containing an answer to some queries made by Mr. Hooke concerning his *Cometographia* formerly sent him. Both these letters were ordered to be inserted in the Letter-Book^d.

Jan. 14. Col. TITUS was elected.

JAMES HOARE, esq; the younger, was proposed candidate by the president.

Mr. Hooke shewed by two sorts of experiments, that the force in moving bodies is in a duplicate proportion to their celerities, so that there is required a quadruple weight to double the velocity.

^c Register, vol. iv. p. 43.

^d Vol. ii. p. 332, and 349.

The first fort was made by a pendulum, made after the manner of a fly, counterpoised; which was several times repeated with the success expected, there being made twelve vibrations with the weight of two ounces, and twenty four vibrations with eight ounces, and forty eight vibrations with two pound weight, all in the same time.

The other fort was with running water, whereby it appeared, that the falling water was to be raised four times the height to run out with double the celerity. This latter was ordered to be repeated at the next meeting, because the vessel leaking hindered somewhat the exactness of the experiment.

Mr. HOOKE produced an instrument with a wheel to perform the same thing in an horizontal position: which was ordered to be tried at the next meeting.

Dr. CROUNE being called up to produce his hypothesis of motion, promised to bring it in at the next meeting.

Mr. OLDENBURG communicated and read three letters from foreign parts: 1. Of Mr. HEVELIUS to him, dated December 11, 1668, congratulating himself on the favourable acceptance, which his *Cometographia* had met with from the society, and answering seven queries proposed to him in a letter by the secretary from Mr. HOOKE concerning his cometical observations. 2. Of Dr. FABRICIUS, a physician of Dantzick, written to Dr. TIMOTHY CLARKE, and dated October 20, 1668, relating several considerable and successful experiments made by injecting liquors into veins, and curing divers diseases, as the gout, the plica Polonica, ulcers and tumors, madness, &c. 3. Of Sir WILLIAM CURTIUS to Mr. OLDENBURG, dated at Umbstadt, December 19, 1668, promising to send some of the Goslarian vitriol, and an account of the way of ordering it; and likewise what he could learn of the way of ordering and preserving wines in Germany.

It was ordered, that Dr. CLARKE be desired to hasten the publication of his book of the various experiments of injection.

Dr. CROUNE having moved, that the experiment so often mentioned of feeding a dog by blood alone, injected into him by a vein every day, might be made, it was ordered, that the physicians of the society should be desired to take care of this experiment; and the operator was ordered to attend them for that purpose: as also, that the same persons should be desired to consider of the fitness of prosecuting the experiment of transfusion; and having agreed what patients it is most proper to be tried upon, to suggest to the governors of hospitals to give leave for that practice.

The experiments appointed for the next day were, 1. To verify the cases of Dr. WREN's theory of motion. 2. To shew again the spherical glass, magnifying as well as elliptical ones, by means of water poured upon it. 3. To shew the proportion of the resistance of the air to bodies moved through it.

Letter-Book, vol. ii. p. 547.

Ibid. p. 352.

Jan. 21. Mr. HOARE was elected.

ANTHONY HORNECK, M. A. was proposed candidate by the bishop of SALISBURY.

The experiment to shew, that water is to be raised four times as high, to run out with double the velocity, was repeated with this effect, that the water raised at that height run out with somewhat more than double the velocity.

The bishop of SALISBURY moved, that this experiment might be tried in a triplicate proportion, to see, whether water raised nine times as high would run out with thrice the velocity. It was ordered to be tried accordingly at the next meeting.

Mr. BOYLE exhibited an experiment to shew, how water moved in an exhausted glass cane; whereby it appeared, that such water being shaken upwards fell down, and knocked against the end of the cane with a sound like that of a dead weight. He added, that he had tried it with several other liquors, with the like effect, except oil and mercury.

He was desired to give his directions for varying this experiment against the next meeting, which he promised to do, and Mr. Hooke was ordered to receive them.

Mr. Hooke affirmed, that the vibrations of a pendulum of eight feet long with a weight of eight pounds (which was of a conical figure) lasted about eight hours.

Dr. CROUNE brought in his hypothesis of motion, which was read, and ordered to be registered², and to be compared by those members, who were formerly nominated for that purpose, with the other theories already given in.

Mr. OLDENBURG delivered a copy of Monsr. HUYGENS's theory of motion to the president for his lordship's examination thereof.

He produced several curiosities delivered to him for the society by Mr. GRIFFITH, merchant in London, who had brought them from Palestine, viz. 1. A small bottle with oil of Jericho, called upon the place *jacoun*, expressed out of a kind of olives, and esteemed to be very sanative to aches and green wounds. 2. Another small bottle filled with water of the dead sea, which was found to be exceedingly salt; and of which Mr. MELLISH, another merchant of London, affirmed to Mr. OLDENBURG, that human bodies could not be sunk in it, by the trial, which he himself made in that sea; with this farther addition, that when he, after swimming therein, came out, putting his garment about him, the lower part thereof dipping in that sea-water became not quite dry again in several days, though exposed to the sun of that hot climate. 3. A piece of a burnt stone, resembling slate,

² Register, vol. iv. p. 44.

which being held in the flame of a candle gave a very odd and very offensive smell.

Mr. BOYLE was desired to examine some of the oil and water, and to give an account to the society of what he should find them; which he promised to do: and a little of both liquors and the stone were ordered to be put into the repository.

Dr. TIMOTHY CLARKE communicated a letter to him from Mr. MICHAEL BEHM, consul at Dantzick, dated there November 2, 1668, containing divers considerable particulars relating to the injection of liquors into veins, degeneration of blood, respiration of fishes, passages of the urine, the use of the gall, the exploding of the spirits in animals advanced by Dr. WILLIS, the epilepsy, &c. It was read, and ordered to be entered into the Letter-Book^a, Dr. CLARKE having given permission for it, who was desired to continue his correspondence with that intelligent person, as well as with Dr. FABRICIUS, whose letter had been read at the preceding meeting.

Notice being taken, that in foreign parts the experiments of injection and transfusion were much practised and improved, whereas they were neglected in England, where they were first invented; it was thought proper, that the cases, mentioned in Dr. FABRICIUS's letter, wherein they had succeeded, should be published in the *Philosophical Transactions*, and the physicians of the society desired, that if they were satisfied therein, they would declare their approbation of the fitness of the trying such experiments in the like cases here: which being done, that it should be represented and recommended to the governors of the hospitals in London for obtaining their leave of making use thereof in such cases.

Jan. 28. Mr. HORNECK was elected.

GEORGE CASTLE, M. D. was proposed by Dr. CHRISTOPHER WREN.

The copies of Monfr. HUYGENS's theory of motion were delivered, one to Dr. WREN, and another to Mr. COLWALL.

The president took notice, that the experiment, shewed by Mr. BOYLE to the society at the last meeting, of the falling down of water like a dead weight in an exhausted glass-cane did not, when it was made the day following at Whitehall, succeed at first; but that at last it succeeded very well in his Majesty's presence, after the cane had been several times turned to and fro, by the doing of which his lordship conceived, that some particles of air, yet latent in the water, had got between it and the glass, and facilitated the separation of the water from the same, after it had stood still therein for a good while, and gained a kind of adhesion to the sides thereof.

^a Supplement, vol. ii. p. 92.

This experiment was ordered to be repeated at the next meeting with a larger cane.

Several experiments were tried tending to verify the theories of motion communicated by Dr. WREN and Monsr. HUYGENS; but the apparatus not being perfect, it was ordered, that it should be made fit against the next meeting for the better prosecution of these experiments.

Dr. WREN was also desired to calculate some cases from his theory, to be verified by experiments at the next meeting.

Mr. HOOKE made an experiment, tending to shew, that a body, once put in motion, would move perpetually, if it met not with resistance. This he did by hanging a wheel, having a pointed piece of iron in it, on a capped load-stone, and putting it into motion by a pair of bellows; whereby the wheel continued its motion for a considerable time, as having but little resistance, which was no other than that of the air, in which it moved round.

It was suggested, that it were worth observing, how the velocities of this motion decreased in equal times.

Mr. OLDENBURG communicated and read a Latin letter to him from Dr. MARTIN FOGELIUS of Hamburg, dated there January 1, 1665¹, containing an account of some manuscripts left by the famous philosopher JOACHIM JUNGIIUS², concerning motion, and APOLLONIUS PERGÆUS *de locis planis* in two books; of the former of which subjects were transmitted the chief heads, as of the latter the method observed therein. The writer of this letter having expressed his inclination to publish those writings, if encouragement were given thereto, it was ordered,

¹ Letter-Book, vol. iii. p. 5.

² He was rector of the Gymnasium at Hamburg. In the original draught of a letter of Mr. (afterwards Dr.) JOHN PELL, to Sir CHARLES CAVENDISH, dated at Amsterdam 23. 1644, extant in the collection of Dr. PELL's manuscripts, procured by me for the Royal Society in July 1755, that eminent mathematician recommends Dr. JUNGIIUS and JOHN ADOLPHUS TASSIUS, co-rector of the same Gymnasium, to the acquaintance of Sir CHARLES, who was then at Hamburg, as both mathematicians, of whose abilities and worth he had a great opinion. He remarked, that JUNGIIUS had many things in print, as *Apudistica*, and *Apudistica*: That TASSIUS had two years before reprinted JUNGIIUS's *Geometria Empirica* in five sheets of paper, but without diagrams: That TASSIUS was a very courteous, affable, open man; JUNGIIUS a little more reserved. He added; "The most barbarous nations had something to worship; and there are few men, that have not some idol, some man or woman,

"whom they esteem and admire above all the rest of mankind; and JUNIORUS is mine. For I esteem of men more or less as I find them more or less rational; and therefore having seen something of JUNGIIUS's writing, wherein he seemed to me to make a truer and better use of his reason, and to manage that divine instrument of instruments with more dexterity and skill than any other son of ADAM, all other writers must pardon me, if I profess to expect more solidity in JUNGIIUS's writings than in any other man now living. If you find but the one half of what I imagine to be in JUNIORUS, you will never be able to relish any other modern philosopher." Sir CHARLES CAVENDISH in a letter to Mr. PELL without a date, but received by the latter at Amsterdam Sept. 23, 1644, mentions his having seen JUNGIIUS, whom he found very free, and who, he observed, preferred the analytics of the ancients before Vieta's by letters, as being more subject to errors and mistakes, though more facile and quick of dispatch.

that

that he should be desired to inform the society, in what manner the subject of motion was treated by JUNIUS; and, if it could be conveniently done, to send over a small specimen of the way of his handling any one of the heads specified in the letter.

February 1. At a meeting of the COUNCIL were present

The President

The lord HENRY HOWARD
The lord BERKLEY
The lord bishop of CHESTER
The lord BRERETON
Sir ROBERT MORAY
Sir PAUL NEILE

Sir GEORGE ENT
Dr. GODDARD
Dr. CLARKE
Mr. COLWALL
Dr. CROUNE
Mr. OLDENBURG.

The lord BERKLEY was sworn of the council.

The draught of the contract of the society with Mr. COLE concerning Chelsea-college was ordered to be ingrossed by the care of Mr. HOSKYNs against the next meeting of the council, to be then sealed.

The treasurer was desired to be then present, in order to pay Mr. COLE the hundred pounds out of the society's chest.

It was ordered, that Dr. BALLE be desired by Mr. HOSKYNs to be on the Wednesday following in the morning, at Arundel-House, there to meet Mr. WALKER in the society's library, and together with him to perfect the catalogue of the books, especially the manuscripts; and that Mr. HOOKE be desired by the amanuensis to deliver the key of the library to Dr. BALLE, if he cannot be there himself:

That the catalogue of the said manuscripts being made, it should be delivered to Mr. COLLINS, that he might inform himself, what value to put upon them: And

That the treasurer do pay to Mr. HOOKE the arrears due to him, according to the allowance appointed him by the order of council of Novemb. 23, 1664, of thirty pounds a year.

Mr. JAMES GREGORY's reply to Monsr. CHRISTIAN HUYGENS in defence of his *Vera Circuli & Hyperbolæ Quadratura*, was declared fit to be printed in the *Philosophical Transactions*¹; but withal, that care should be had of omitting all, that might be offensive.

Mr. HOSKYNs brought the papers concerning the society, that were left with

¹ It was accordingly printed there vol. iii. n^o 44, p. 822, for February 1665.

Sir ANTHONY MORGAN, to the council, to the number of thirty eight, great and small; which were delivered to the care and custody of Mr. OLDENBURG.

The bishop of CHESTER proposed a person proper for translating the *History of the Royal Society* into Latin, if he might have some encouragement for doing it; and being asked, what recompence that person would expect, his lordship said, he doubted not but thirty pounds would content him.

It was ordered thereupon, that he should be encouraged to undertake it; and that such a reward should be made good to him one way or other; so that where the printers of the society should prove deficient in paying him such a sum, the council would make it up.

It was moved by Mr. OLDENBURG, that the council would think upon an effectual way of carrying on the business of experiments at the meetings of the society; and that in order thereunto they would consider, whether it were not fit to constitute one or two committees, made up both of members of the society and the council, proper for directing of experiments; which committees might meet for that purpose at least once a month, one in the city, and the other at Westminster end of the town. The proposal being approved of, the president said, that he would consider of the persons proper for such a work.

Feb. 4. At a meeting of the SOCIETY,

Dr. CASTLE was elected and admitted.

Two experiments were made with balls to verify Dr. WREN's laws of motion.

1. Two equal balls, whereof one was let fall from the degree of 12, the other from that of 6, after the impulse moved with contrary velocities, viz. that of 12 with 6, and that of 6 with 12 *ferè*.

2. Two unequal bells, which were in weight to one another as eight to one, after the impulse moved with a proportionate velocity. Falling both from the same height 12 and 12, the bigger returned to $2\frac{1}{2}$, and the smaller $11\frac{1}{2}$.

Falling both from $4\frac{1}{2}$, the bigger returned to $3\frac{1}{2}$, the smaller to $12\frac{1}{2}$.

Two copies of Monfr. HUYGENS's theory of motion were delivered, one to the lord BRERETON for Dr. PELL, the other to Mr. NEILE.

A letter from Monfr. HUYGENS to Mr. OLDENBURG, dated at Paris 6 Feb. 1669, N. S. ^a was read, acknowledging Dr. WREN's laws of motion to be altogether conformable to his, and desiring to know, what kind of demonstration Dr. WREN made use of to prove them by; proposing also a way of securing his dis-

^a Letter-Book, vol. iii. p. 22.

coveries or inventions for the future by way of cypher or anagram, to be lodged in the Register-book of the society, till he should think it convenient to explain them in a common language; making withal a beginning of this way of communicating new discoveries by sending the following cypher; which was ordered to be entered into the Register-book¹.

a	b	c	d	e	h	i	l	m	n	o	p	r	s	t	v	y
5	2	2	1	4	1	2	3	3	1	3	2	2	3	2	4	1.

In the mean time some of the members intimated, that this way was capable of containing more secrets than one; and that another might find out an invention, and comprize it in the very same cypher, which then might be claimed by him, who had first proposed the cypher.

Dr. WREN ex tempore presented the society with a cypher of a late invention of his, which he desired might be sent by Mr. OLDENBURG to Monsr. HUYGENS by way of exchange, and entered also into the society's Register-book², as follows:

a	b	c	d	e	f	g	h	i	l	m	n	o	p	r	s	t	v	x	y
7	4	4	4	12	1	5	6	10	7	1	7	9	2	6	2	7	4	1	1.

The experiments appointed for the next meeting were those of motion, of which Dr. WREN and Dr. CROUNE were desired to calculate several cases, according to their respective hypotheses.

February 8. At a meeting of the COUNCIL were present

The President

The lord BERKLEY
Mr. AERSKINE
Sir ROBERT MORAY
Sir GILBERT TALBOT
Sir PAUL NEILE

Dr. GODDARD
Dr. CLARKE
Mr. COLWALL
Mr. OLDENBURG.

It was ordered, that the lord HENRY HOWARD of Norfolk, Mr. AERSKINE, Dr. GODDARD, Dr. BALLE, Mr. HOSKYNs, Mr. HOOKE, and Mr. COLLINS, or any three or more of them, be a committee, to consider, which of the manuscripts of the library bestowed by the said lord HENRY HOWARD upon the society are proper to be kept, and which to be parted with to the university of Oxford, together with the reasons for both.

Mr. HOSKYNs was desired to attend the lord HENRY HOWARD with this order, and to learn of his lordship what time would be convenient to him for the meeting of this committee.

¹ Vol. iv. p. 49.

² Ibid.

The catalogues of the books were committed to Mr. HOSKYNs for the use of the said committee.

An assignment of Mr. COLE's lease of Chelsea-college was read and sealed, and delivered with an assignment indorsed and executed; and these put into the cash-chest of the society at the house of the president; out of which chest Mr. COLE received the one hundred pounds for the said assignment.

It was resolved, that at the next meeting of the council should be considered, what might be the best way of employing Chelsea-college.

February 11. At a meeting of the SOCIETY,

Mr. HOOKE being absent, the experiments of motion were not prosecuted.

The president proposed to the society the appointing of two committees for considering of and directing experiments to be made from time to time at their weekly meetings; which being approved of, there were named for that purpose the following persons, viz. for Westminster, the bishops of SALISBURY and CHESTER, Mr. BOYLE, Sir ROBERT MORAY, Sir GEORGE ENT, Dr. CLAPKE, Dr. WREN, Mr. WILLIAM NEILE, Mr. HENSHAW, Mr. LOCKE, and Mr. HOSKYNs; and for the other committee to meet in the city were named Dr. GODDARD, Mr. COLWALL, Dr. CROUNE, Dr. ALLEN, and Mr. HOOKE: Three or more of each of them to be a quorum, and they to meet constantly once a fortnight at least, and to begin to do so, the former at Sir GEORGE ENT's house, and the latter at Mr. HOOKE's lodgings in Gresham-college, the first time on the Tuesday following in the afternoon February 16, and to advise and agree together about the best ways of carrying on this work to the satisfaction of the society. The chairman of each committee to take care of giving notice of the meeting of them from time to time, and to make use of the operator for trying of experiments: Every member of the society to have the liberty of being present at either of the committees, and to assist in promoting the work.

The operator was ordered to speak to Mr. HOOKE, that the new great microscope of Mr. CHRISTOPHER COCK's making be brought to the society at the next meeting.

Mr. HOSKYNs produced a new kind of sealing-wax, soft and tough, not sticking, and when burnt at a candle, and dropt on paper, growing hard, like Spanish wax, and taking the impression as well as that wax. Some of the members conjectured, that it was made up of lacca mingled and wrought with some gum or other, perhaps gum tragacanth, or the like.

The amanuenss produced some of the water, brought out of Suffex near Rye, said to be very medicinal, which formerly had been mentioned in the society. The water being in a wooden vessel, it was desired, that some of it might be sent for in
glafs-

glafs-bottles, well stop'd; and that in the mean time the Journal be searched, to find-out upon what account it was formerly commended in the society.

This occasioned some discourse about the best way of examining mineral and other waters; upon which Mr. HENSHAW said, that he had found it the best way to let them first putrefy, and the liquor being opened thereby, then to distil them; whereupon it would best appear, what salt was contained in them.

Dr. GODDARD observed, that mineral and other waters being distilled without any previous putrefaction, it would be better discovered what came from the waters themselves, since it was not known, whether by putrefaction there might not be introduced something adventitious.

Mr. HENSHAW was of opinion, that after putrefaction much more would be observed of the self-same matter with that, which would be produced by distilling such waters without putrefaction.

Dr. ALLEN mentioned, that he had obtained some crystals of the waters of Barnet and Epfom. He was desir'd to produce them, which he promised to do.

Dr. CROUNE affirmed, that by dropping but one drop of oil of tartar into a glass of Barnet water, it became of a milky colour; and that it had this effect more upon that water than upon Epfom water.

Sir THEODORE DE VAUX produced two papers written and sent to him by Dr. JOHNSON; one of which contained inquiries for Africa; the other, some illustrations of his concerning Ariconium, supposed to have antiently been one of the Roman baths. Both papers were committed to Mr. OLDENBURG, who was desir'd to collect out of the former such queries, as were proper to be added to those, which he had already in his hands, to be recommended to the lord HENRY HOWARD for Africa; and to peruse the other paper, and give the society an account of the contents thereof:

Upon the rising of the society, Mr. BOYLE coming in late mentioned to the president an experiment of a certain kind of thick glass, which would break, having been held a while in a warm hand, and then gently struck within by a bodkin. The president took it with him to a private company, whither he retired with several members of the society, and where he said he would try it, and make a report of it at the next meeting. The glass was unnealed*, and of a conical shape, open at one end, and pretty narrow.

February 18. The experiments of motion were prosecuted with springy bodies, by which it appeared to some of the members, that the laws of motion, established by Dr. WREN, were best verified by the motion of the most springy bodies. These experiments were ordered to be continued at the next meeting.

* See *Philos. Transact.* vol. xliii, n° 477, p. 505.

Mr. OLDENBURG brought in several papers :

One was a packet sent to him for the society by Signor MALPIGHI, containing a manuscript history of the silk-worm, its whole life, and the anatomy of all the parts thereof, delivered to the society, consisting of twelve folio-sheets, and of as many microscopical draughts in folio. It was ordered, that the hearty thanks of the society be returned to the author by a letter to be drawn up by Mr. OLDENBURG ; and that he and Mr. HOOKE be desired to peruse those papers, and to make a report thereof to the society at their next meeting ; and that the consideration of publishing them be referred to the council.

Mr. OLDENBURG then communicated a letter concerning snails and spiders, sent to him in one of Feb. 16, 1664, by Mr. SKIPPON, who had received it from Mr. WRAY, to whom it had been communicated by a friend of his at Cambridge. It was read, and thought very curious ; and it was ordered, that this paper should be inserted in the Letter-Book *, and the author be desired to continue his observations about those insects, and especially the thread flying in autumn, supposed by him to be made by spiders.

Mr. OLDENBURG communicated likewise a letter written to him in High-Dutch, January 30, 1664, by a Colonel at Hamburg, named BERTRAND DE LA COSTE, pretending to have found out, after twenty three years search, an engine, called by him *Machina Archimedis*, able to move any weight whatsoever ; which he was willing to shew to the society, and to submit it to the examen and censure of the severest mathematicians and mechanists. It was ordered, that the proposer should be asked, whether his engine would move any weight in any time given ? or what proportion of time he would demand to his force ? and what experiments he had made of the performances of his engine ?

Mr. HENSHAW, upon occasion, mentioned the way of hatching chickens by *laleum*, formerly used in the Minorities by Dr. KEFFLER's † brother ; the particulars of which he was desired to bring in writing, which he promised to do.

The ways of purifying oil being spoken of, it was supposed by Mr. HENSHAW, that distilling it from quick lime would much free it from the topus. Others moved, that it should be inquired, how the oil used in churches was purified.

Sir ROBERT MORAY affirmed, that one pint of spirit of wine with a single thread would burn three days.

Mr. CHRISTOPHER COCK produced a microscope, which he said he had made for the society, if they liked it, with five glasses, of which the four eye-glasses were plano-convex, two and two so put together, as to touch one another in a point of

* It does not appear there, but it is printed in the *Philos. Transact.* vol. IV. n° 50, p. 1011, for August 1669.

† Dr. KEFFLER was son-in-law to the famous CORNELIUS DREBEL. MONCONY, *Voyages en Angleterre & aux Pays Bas*, p. 74, edit. Paris 1695.

the

the convex surface. Some observations being made therewith, it appeared to do very well; but there being a guinea put in it, and looked upon, some of the members saw the image depressed, others embossed. The workman referred himself to the society for the price of this microscope, and the society referred it to the council.

Mr. AUBREY mentioned, that he had lately again observed, together with Mr. HOSKINS, the nubecula seen by him first April 27, 1668, between Cancer and the head of Hydra, employing a seven foot telescope. His account of it was ordered to be registered^a.

Feb. 22. At a meeting of the COUNCIL were present

The President

The earl of SANDWICH
Sir GILBERT TALBOT
Sir ROBERT MORAY
Sir PAUL NEILE

Sir GEORGE ENT
Sir THEODORE DE VAUX
Dr. CROUNE
Mr. OLDENBURG.

It was ordered, that the treasurer pay to Mr. CHRISTOPHER COCK eight pounds for a large microscope made by him for the society: and

To the operator the arrears of his yearly salary of ten pounds: and

That the history of the silk-worm, written in Latin by Signor MARCELLO MALPIGHI, and dedicated to the society, be printed forthwith by their printers, and that notice be given to the author of this order; the form of which order to be as follows:

" *Tractatus, cui titulus, MARCELLI MALPIGHII dissertatio epistolica de bombyce*
" *Soc. Regiæ dicata, imprimatur à JOHANNÉ MARTYN et JACOBO ALLESTRY,*
" *dictæ societatis typographis.*

" Brouncker, P. R. S."

Sir ROBERT MORAY made a proposition, which he said he had received from a noble member of the society, concerning Chelsea-college, to this effect, that this person was willing to undertake the management of the house and land of the said college, so as to employ it, according to the design of the society, in planting the ground with all sorts of choice vegetables, exotic and domestic, and in repairing the house, all at his own charges, the society remaining always proprietors and masters thereof, with a full power of ordering and directing what particulars they would have observed and done in the management of this affair, the proposer only expecting to be perpetual steward of that place.

^a Register, vol. iv. p. 48.

This was received as a noble proposition; only Sir ROBERT MORAY was desired to employ his interest with the proposer to have it put in writing for preventing of mistakes.

The amanuensis was ordered to go to Dr. CLARKE from the council, and to desire him to deliver to him the paper of proviso's to be inserted in the additional patent, and to carry the same to the solicitor of the society, to get it inserted accordingly.

Feb. 25. At a meeting of the SOCIETY.

Some experiments were made, to find what would be the resistance of air to bodies moved through it with several velocities; and it seemed, that the larger the arch was, in which the pendulous body moved, the more impediment it suffered from the air: and the slower it moved through the air, as when it moved in a smaller arch of a circle, the less stop it received from the impediment of the air, and the impediment to motion decreased in a greater proportion than the decrease of the velocity: but what the exact proportion of decrease was, was to be found out by farther trials.

It was ordered, that this kind of experiments should be prosecuted at the next meeting by employing boards or plates of several expansions, but all of the same weight; and with balls or boards of several weights, but of the same expansion.

Mr. HOOKE proposed an experiment to find out, how the magnetical power decreases at several distances, and promised to bring in at the next meeting a watch, the balance of which should move by the force of a magnetic steel.

Dr. HOLDER presented his written discourse concerning *the Elements of Speech; an Essay of Inquiry into the natural production of letters, together with an Appendix to instruct persons deaf and dumb.*

The bishop of CHESTER intimating, that he had read it, and found it a well-considered discourse fit to be published, it was ordered, that it should be transcribed for the press accordingly, and the original kept for the Register-Book of the society.

Mr. HOOKE reported, that he had perused Signor MALPIGHI's discourse of silk-worms, and found it very curious and elaborate, well worth printing. This was seconded by Mr. OLDENBURG, who thereupon read the letter, which he had drawn up for Signor MALPIGHI, thanking him for his great respect in dedicating the said discourse to the society: which letter was approved of, and ordered to be entered in the Letter-Book.

Mr. OLDENBURG read a paper containing some answers to queries about Japan, which was ordered to be filed up.

...

It is not entered there,

1

March

March 1. At a meeting of the COUNCIL were present

The President

The lord HENRY HOWARD
Mr. AERSKINE
Sir ROBERT MORAY
Sir GILBERT TALBOT
Sir PAUL NEILE
Sir GEORGE ENT

Mr. EVELYN
Dr. CLARKE
Dr. GODDARD
Dr. CROUNE
Mr. OLDENBURG.

It was ordered, that notice be given to those of the committee for considering the manuscripts in the society's library, to desire their attendance on the council on the Thursday following at two in the afternoon at Arundel-house :

That Mr. HOSKYNs and Mr. OLDENBURG inquire of Mr. WILLIAMSON, whether it be the practice to add any particulars, by way of indorsement or otherwise, to patents already signed by the King ; and if so, then to go, together with Col. TITUS, to the attorney-general, to acquaint him, that it is the pleasure of the lord privy-seal, to insert those two clauses concerning the oath of allegiance and supremacy, to be given to the president and his vice-presidents ; and that of non-alienation : and

That Signor MALPIGHI, upon the motion of Mr. OLDENBURG of choosing him an honorary member of the society, be proposed as such at the next meeting of the same.

March 4. At a meeting of the COUNCIL were present.

The President

Sir GILBERT TALBOT
Mr. AERSKINE
Sir PAUL NEILE
Mr. EVELYN
Mr. HENSHAW

Dr. GODDARD
Dr. CLARKE
Mr. COLWALL
Mr. OLDENBURG.

The committee for considering the manuscripts in the library bestowed by the lord HENRY HOWARD of Norfolk on the Royal Society made their report : whereupon the council having debated it, and coming to no resolution therein, thought fit to order, that the secretary should acquaint Mr. WALKER, that they were not yet come to a resolution in this business ; but, when they were, would take care, that the vice-chancellor of Oxford should have notice of it.

The report of the said council was as follows :

“ In pursuance of an order of council of the Royal Society dated 8 Feb. last, “ we have considered the manuscript books in the library bestowed by the honourable “ HENRY lord HOWARD of Norfolk on the Royal Society, and do find them chiefly “ valuable.

" valuable for their rarity and the reputation they carry along with them upon that account, being unlikely to be otherwise of any very great advantage, either to the university of Oxford or to the Royal Society. Neither can we pitch upon any certain rule of putting a price upon them, they being single each in its kind, and not possibly to be supplied, if once parted with; which besides can hardly be done, without seeming to slight the munificence of the giver, who has appeared willing to reserve and continue to himself and honourable family the ownership in name of that library, the use of which he was pleased to bestow on the Royal Society. All which we humbly certify as our opinion this first of March, anno Domini, 1663.

" WILLIAM AERSKINE,
" JOHN HOSKYNES,
" PETER BALLE."

It was ordered Dr. HOLDER's *Elements of Speech*, &c. be printed by the society's bookfellers.

At the meeting of the SOCIETY on the same day,

Mr. HORNECK was admitted.

Signor MALPIGHT was proposed by Mr. OLDENBURG for an honorary member, and elected as such *nemine contradicente*, he having by his letters and the dedication of his dissertation on the silk worm expressed a singular respect for the society.

Upon the election Mr. OLDENBURG was ordered to draw up a diploma, as a testimony of the same, to be sent to Signor MALPIGHT at Bologna.

Some more experiments were made, to find what is the resistance of the air to bodies moved through it with several velocities; which was at this time done with several weights fastened to the same area of a thin latin plate.

The double weight being fastened to the plate, the vibrations of the whole were after this manner:

" It is entered in the Letter-Book, vol. iii. p. 37. as follows. " PRAES. CONCILIUM, et SOCIETAS REGALIS SOCIETATIS Lond. ad scientiam naturalem promovendam instituta omnibus et singulis, ad quos praesentes pervenerint salutem.

" Cum virtute et medicis atque anatomicis peritiis clarissimus dominus MARCELIUS MALPIGHIUS, professor et medicus Bononiensis, in quo Massinensi academiae medic. professor primarius, singularem suum in praedictae societatis institutum et studia affectum humanissimis doctrinisque suis literis ad ipsam datis uberissime fuerit testatur, fuitque meritis egregiis solidam

" imprimis philosophiam provehere et augere pro viris satagat, data societati laudatum dominum MALPIGHIUM die 4 Martii in solenni consensu, conspirantibus cunctis suffragiis, in sodalium suorum album cooptavit, inque hujus rei testimonium monumentum hoc publicum extare, et sigilli suo munire voluit. DR. LOND. anno aerae Christianae 1669, regni CAROLI II. augustissimi Magnae Britanniae, Franciae, et Hiberniae, regis, digne societatis fundatoris et patroni, vicelimo primo."

" Mr. OLDENBURG in a marginal note on this minute remarks, that the result of the single weight was not observed by him.

18. 15 $\frac{1}{2}$. 12. 9 $\frac{1}{2}$. 8. 7 $\frac{1}{2}$ *circiter*.

The treble weight being fastened to the same plate, the vibrations were as follow:

18. 16 $\frac{1}{2}$. 13 $\frac{1}{2}$. 12. 11. 10. 9 $\frac{1}{2}$. 8 7 $\frac{1}{2}$ *circiter*.

The quadruple weight being fastened still to the same plate, the vibrations were thus:

18. 17. 15. 13. 11 $\frac{1}{2}$. 10 $\frac{1}{2}$. 9 $\frac{1}{2}$. 8 $\frac{1}{2}$. 7 $\frac{1}{2}$.
7 $\frac{1}{2}$. 6 $\frac{1}{2}$ *circiter*.
7.

These experiments were ordered to be varied at the next meeting, by applying the same weight to several areas, as now they were tried by applying several weights to the same area.

There was viewed in the great microscope, lately bought by the society of CHRISTOPHER COCK, a leaf of a palm-tree, which appeared to be nothing but a congeries, of an excellent contrivance, of vessels orderly laid together without any pulp.

It was ordered, that the cells in the microscope should be so contrived, as to place the glass therein in any fit position, against the next meeting.

Three books were presented to the society, one intitled, *A short Relation of the river Nile, &c. and of other curiosities*, translated out of a Portuguese manuscript by Sir PETER WYCHE; the second, *Traictatus de Corde: item de motu & calore sanguinis, et chyli in eum transitu*, by RICHARD LOWER, M. D. *; the third, the second edition of Monfr. LE FEBVRE's *Treatise of Chemistry*.

Mr. OLDENBURG read a letter to himself from Dr. EDWARD BROWN, dated at Vienna, Feb. $\frac{1}{2}$, 166 $\frac{1}{2}$, concerning some natural curiosities, which he was collecting in his tracts for the society's use. It was ordered, that he should be thanked and encouraged in his design by the secretary, and his letter entered into the Letter-Book.

* Printed at London 1669 in 8vo. Mr. OLDENBURG in his account of this book in the *Philos. Transact.* vol. iv. n^o 45. p. 911. takes notice of a mistake in it, chap. iv. where Dr. LOWER calls those *Transfusions* the *Transfusions of the Society*; "which certainly he would not have done, says Mr. OLDENBURG, if he had

"either but taken notice of what is said in n^o 11. of the same, or else considered, that so illustrious and learned a body would certainly, if they thought fit to publish any thing, entertain "the knowing world both with sublimer matter "and with a suitable eloquence."

* Vol. iii. p. 20.

Mr. BOYLE moved, that he might be desired to inquire, whether there was any *cinnaberis nativa transparentis* in those parts.

Mr. OLDENBURG read likewise a letter to him from Mr. CHILDREY, dated at Upway near Weymouth in Derbyshire, Feb. 9, 1665, concerning a mineral well in a village called Nottingham, in the parish of Broadway in that county, and an account, 1. Of a child, born at Upway in April 1668, with five fingers on a row, and a thumb on each hand, and six toes in the same manner on each foot : 2. Of one WILLIAM TOWNSON of the same parish, who at about thirty years of age, shed all his teeth (as he had done before at seven) and had new ones in their room : and 3. Of an extraordinary tide at Weymouth on Tuesday July 17, 1666, about ten in the mornings, when it being almost low water, the sea came in with so strong and violent a flood, as if it had been at a mill-tail, the tide rising above four foot in a quarter of an hour, and then ebbing, but quickly flowing again, sometimes in, and sometimes out, five or six, or, others said, seven or even nine times. This letter was ordered to be entered in the Letter-Book ⁷.

It being suggested, that the æquinox being near, some care should be taken of observing the precise time of the sun's entrance into aries, Mr. Hooke said, that he intended to make a proper apparatus for it against the next autumnal æquinox.

The experiments appointed for the next meeting, besides those above-mentioned, were Mr. Hooke's magnetical watch, and that of falling mercury in a glass cane.

March 11. The experiments of motion made at the last meeting being again spoken of, the president intimated, that the result of them seemed to be, that the heavier body fastened to the round plate maketh the greater excursion. and therefore continueth the longer ; but that still it remained to be inquired after, what was the precise resistance of the air to bodies moved through it.

The prosecuting and varying these experiments, by applying the same weight to several bodies, which should have been done at this meeting, was referred to the next, and Mr. Hooke was ordered to take care, that then it might be done.

It was also moved, that he should bring in his new contrivance of a watch, said to move by a balance touched with a magnet.

There were dissected some oysters ; and because the functions of many parts of them were not yet known, Dr. KING was desired to produce at his first conveniency a live oyster, and lay open all the parts thereof, to the end, that those, that are well known, might give light to those, that are not so ; and particularly, that the vent, whence the spawn issues, may be inquired into. Dr. KING promised to do this.

Mr. Hooke remarked, that he had examined some frogs, and found in them a seminal and excremental vent : and that he had looked upon the black round

⁷ Vol. iii. p. 24.

spawn of frogs by a microscope, and thought, that he saw a whitish tegument round about the black substance, and was of opinion, that that was like the white of an egg, as he guessed the black matter within to be instead of the yolk. He undertook to observe the progress of frogs spawn from time to time.

Occasion being given to speak of tarantula's, some of the members said, that persons bitten by them, though cured, yet must dance once a year: others, that different patients required different airs to make them dance, according to the different sorts of tarantula's, which had bitten them.

Mr. BOYLE observed, that EPIPHANIUS FERDINANDUS seemed to him to have given the truest account of the biting of the tarantula's in a small treatise on that subject.

The president moved, that since there was so great a necessity of having more curators than one, the society would recommend it to the council to consider of it, as a thing of so great importance to the advancement of their institution: and it was accordingly referred to the council.

March 18. At a meeting of the COUNCIL there were present

The President

The lord BERKLEY
The lord bishop of CHESTER
Sir GILBERT TALBOT
Mr. AERSKINE
Sir ROBERT MORAY

Sir PAUL NEILE
Dr. GODDARD
Mr. COLWALL
Dr. CROUNE
Mr. OLDENBURG.

It was again considered, whether the society should part with any of the books of the library given to them by the lord HENRY HOWARD; and it being put to the vote was carried in the negative.

The council declared, that it was necessary to have another curator; and that therefore they desired to be informed of a person proper for that office, to whom they would allow fifty pounds a year.

The bishop of CHESTER named Dr. WALTER NEEDHAM and Dr. LOWER.

Dr. CROUNE named Mr. WRAY.

These were both desired to speak or write to the persons proposed by them, in order to learn their inclinations to such an employment.

At a meeting of the SOCIETY the same day,

Mr. HOOKE tried something in order to make a watch go by the force of a load-stone. It was ordered, that he should provide against the next meeting an-
house-clock,

house-clock, going half-seconds, and put a slight upon it, to try what the power of the magnet would be.

It was remarked, that if this contrivance should be made practicable, the magnet would then furnish the navigator with the longitude, as well as it had hitherto served him with the latitude.

Mention was made by Dr. GODDARD concerning an experiment for making out the manner of the motion of the muscles; but a fuller account of it was referred to another meeting.

Dr. CROUNE proposed an experiment, to try, whether an animal would be fed by blood alone transfused into it, viz. by inclosing two dogs in a box, and making the blood circulate from the one to the other by way of transfusion, feeding the one and not the other.

He was desired to make the experiment, and Dr. ALLEN and Mr. HOOKE to assist him in it.

Dr. KINO was put in mind of dissecting a lobster and an oyster.

Mr. COLLINS communicated a paper, written by one Mr. CLERK, about making and using wind-mill sails, that shall go horizontally, and perform more than perpendicular sails, with less charge. It was said to be effected by valves shutting with the wind, and opening, when they came against the wind.

The president remarked, that he had seen such a contrivance, but thought it ineffectual as to use.

March 25, 1669. The SOCIETY did not meet.

April 1 There was tried an experiment, proposed by Dr. GODDARD, to find, whether muscles in their contraction grew bigger upon the whole, or not? The experiment was by inserting a man's arm into an artificial arm made of tin, having a glass-pipe fitted and erected in the hand of it, so as being filled with water, and the hand of the fleshy arm clutched, the water in the pipe subsided; but being relaxed and opened, the water rose: which seemed to shew, that in contraction the muscles, upon the whole, were brought into less dimensions than in their dilatation.

Dr. GODDARD was desired to bring in a full account of this experiment in writing; which he promised to do, having first repeated it*.

This experiment gave occasion to discourse of the cause and manner of pulsation: and it was debated, whether the pulse be caused by the muscular motion of the

* See below the minutes of Decemb. 15, 1669.

heart, or by the ebullition of the blood in the heart, thence discharged into the great artery. Some of the members were of opinion, that when there is a systole or constriction in the heart, there is the like in the artery, and that the arteries have a kind of muscular structure; while others thought, that upon the constriction of the heart follows a dilatation in the artery, or that the systole of the one is the diastole of the other.

For the determining of this question it was ordered, that experiments should be made with a dog, an eel, and a pair of bellows with guts.

Dr. MERRET communicated a letter written by Dr. EDWARD BROWN to his father, Dr. THOMAS BROWN, dated at Vienna March 3, 1663, containing an account of two parhelia lately seen in Hungary, and of four other parhelia seen in the same country in 1668 at Easter. This letter was ordered to be entered in the Letter-Book^a.

Mr. OLDENBURG read a letter to him from Mr. CHILDREY, dated March 22, 1663^b, promising to communicate to the society, not only his collection of philosophical observables to be found in such geographical writings and itineraries, as he had perused, but also the history of weather drawn up by him out of several manuscripts on that subject, which had come to his hands. This letter was accompanied with some powder made of the sediment of the sulphureous well at Nottingham, mentioned in his former letter of Feb. 9. read March 4. which powder being cast upon burning embers in a fire-pan, flamed and burnt blue like powder of brimstone, and smelt perfectly like it. Some of this powder was ordered to be given to Mr. BOYLE to try it, and the rest delivered to Mr. HOOKE for the repository.

April 8. At a meeting of the COUNCIL were present

The President

The lord HENRY HOWARD
The lord BRERETON
Mr. AERSKINE
Sir ROBERT MORAY

Sir THEODORE DE VAUX
Dr. GODDARD
Mr. COLWALL
Mr. OLDENBURG.

It was ordered, that the treasurer pay Mr. GILBERT, solicitor to the society, or to his order, the sum of thirty pounds twelve shillings and ten pence, according to his bill of April 3, 1669; and likewise such monies, as by warrant from the president shall be judged necessary for having the additional patent paid the great seal of England:

That Dr. AGLONBY be for a year more exempted from the weekly contributions, he having desired that indulgence by Sir THEODORE DE VAUX: and

^a Vol. iii. p. 34. and Supplement, vol. ii. p. iv. n^o 47. p. 953. for May 1669.
105. It is printed in the Philof. Transact. vol. ^b Letter-Book, vol. iii. p. 59.

That

That Dr. MERRET be conferred with against the next meeting of the council concerning THOMAS WILLISEL, the botanic traveller, to testify what he knows of his abilities in collecting plants and other natural curiosities; and that WILLISEL be summoned accordingly to attend the council at their next meeting to receive their resolution and orders.

At a meeting of the SOCIETY on the same day,

There was made one of the experiments appointed at the last meeting, viz. that with guts blown up, and tied on both ends, to shew, that for making a pulse in the arteries there needs no more than a compression in the heart, since the gut being compressed on one end, the motion of it was sensible at the other.

Dr. GODDARD objected, that this was not sufficient to make out what was intended, since there was no outlet in these guts; whereas there is an issue of the blood in the body of animals out of the arteries into the veins.

Mr. HOOKE answered, that there is so, yet there being a return of the blood to the heart again, it could not be otherwise, but that, the vessels being full, there would upon the circulation of the blood into the heart again and its systole, be caused a pulsation in the arteries.

He proposed an addition of a pipe to this experiment, the better to shew the truth of his assertion.

He produced some plano-convex spherical glasses, as small as pins-heads, to serve for object-glasses in microscopes. He was desired to put some of them into the society's great microscope for a trial.

He proposed likewise an observation to be made of the texture of muscles by a microscope, which he promised to make for the next meeting, and then shew it to the society.

Mr. OLDENBURG produced a printed paper, part of the *Journal des Sçavans* for March 18, 1669, N. S. wherein the four rules of motion formerly sent to the society by Monfr. HUYGENS were printed, together with three more belonging to the same subject. Mr. OLDENBURG intimating, that the Parisian philosophers were very diligent in making experiments in order to the verifying or disproving of those rules, and moving, that what had been lately begun here of that nature might be vigorously prosecuted, it was ordered, that Dr. CROUNE should be desired to undertake that task, and to make such experiments in private, where it might be more conveniently and more leisurely done than in public; and having so done, to give an account of their success to the society: Dr. CROUNE being spoken to accordingly, promised, that he would do it, but desired, that it might be done in Gresham-college, that so he might have the assistance of Mr. HOOKE, the hands of the operator, and the apparatus necessary thereto; which was approved of.

COUNT UBALDINI produced a little roundish oblong grey stone, taken out, as he affirmed, by a lady from under her tongue, after she had endured for two days very great pains in her throat, which had been thought to be a quinsy; on which account she had been let blood under the tongue; which not curing the pain, she at last felt something hard under her tongue, and putting her fingers to it, cried out, that there was a tooth coming out from under her tongue, and so plucked out this stone, which the count shewed the society, but took it away with him.

April 15. Mr. HOOKE exhibited again the experiment of the watch moved by a magnet, which, according to its several distances from the flight fitted to the watch, made it go faster or slower.

Sir ROBERT MORAY suggested several doubts to be considered in this experiment, 1. Whether the load-stone hath the same attraction in all positions? 2. Whether some kind of earth or rock may not alter the power of attraction? He alledging, that in Scotland there was a whole ridge of rocky mountains of a magnetic virtue, &c. 3. Whether there would not be found a difference in the attraction, according to a nearer or farther distance of the load-stone from the land?

The president moved, that it might be tried, whether a watch thus moved by a magnet would go equally with a stronger or weaker spring; for which purpose, his lordship proposed, that the watch and load-stone being fixt, the spring of the watch should be wound more or less high, to see, whether the motion caused by the magnet would be always equal.

It was ordered, that a piece of clock-work with a spring going seconds should be provided for the next meeting, to be tried with a load-stone.

Mr. OLDENBURG communicated two letters written to him, one in French by Monsr. LANTIN, a counsellor of the parliament of Burgundy, dated November 30, 1668, accompanying a present of a book intitled, *Claudii Salmafci Prefatio in Librum de Homonymis Hyles Iatricæ; ejusdem de Plinio Judicium**: The other in Latin by Mr. HEVELIUS dated March 21, 1669, N. S. containing expressions of his readiness to print the papers of Mr. HORROX, as they had been digested by Dr. WALLIS.

It was ordered, that Monsr. LANTIN and Mr. HEVELIUS should be thanked by the secretary* for their respect to the society, and that Mr. COLLINS should be desired to take care of having a copy made of those papers of Mr. HORROX in the hands of the president; and that this copy should be transmitted to Mr. HEVELIUS by the secretary.

* Letter-Book, vol. ii. p. 339. It is printed in the *Philos. Transact.* vol. iv. n° 46, p. 336, for April 1669.

* Printed at Dijon 1668. in 4°.

* His letter to Monsr. LANTIN was dated April 14, 1669. Letter-Book, vol. iii. p. 63.

Mr.

Mr. OLDENBURG read likewise an extract of a letter written by Dr. DOWNS from Rome Feb. 9, 1669, N. S. to Mr. SKIPPON, who had sent it out of the country to him, to communicate the contents thereof to the society; which were chiefly concerning a dog bitten by a viper, and recovered by a stone, taken out of the head of a serpent called *Cobra de Capelos*; and also concerning a man stung by a scorpion in the hand, and cured by such a stone; together with a proposal made by a person at Rome, for observing daily the different degrees of heat and cold between London and Rome for a whole year's time.

It was ordered, that Dr. DOWNS be desired to get the experiments with the serpent-stone repeated upon two dogs to be bitten in the same part, to see whether one of them would not recover without the application of such a stone.

Mr. OLDENBURG produced some Bononian stones uncalcined of that kind, which imbibe and retain light. It being mentioned, that the person, who had the art of fitting those stones for performing that odd effect, being dead, and the way of so preparing them thought to be lost with him, these stones were ordered to be delivered to Mr. BOYLE, to try whether he could not light upon some way of so preparing them, that they might shine in the dark.

Sir ROBERT MORAY produced the skin of a Moor tanned, which he said was offered to be sold for five pounds; and being thought proper for the repository, it was ordered that the treasurer should pay that sum for the purchase of it.

April 22. The society did not meet.

April 29 Mr. HOOKE produced his magnetical watch improved by having so contrived the magnetical balance, which was instead of a pendulum, as to make it vibrate as little arches, as should be desired, thereby to make the vibrations always equal, and the magnet to have stronger influence upon the said balance.

It was again ordered, that a hand shewing minutes and seconds should be added to it, thereby to compare it with a pendulum, for an assurance of its going equal.

Mr. HOOKE mentioned, that he had still another way of measuring time exactly, wherein a sudden turning motion should not cause a stop or disorder, as it did in this way.

Two microscopical observations were made, one of the texture of fat, which appeared to be like froth full of cells; the other of a kind of mould upon book-binders paste, which was found to have a fine moss growing on it, that had on the tops of its stems a head like feed.

Mr. BOYLE acquainted the society, that on the sea-side in some part of Devonshire there grew in the sea a bean-bearing tree, having its lower part under water, whose wood was hard, and the upper part like a bean-stalk.

He

He shewed a pretty large piece of black amber found on the sea-shore in Suffex; as also a great number of stringed and all rhomboid-like pieces of talc; of which kind of substance, another member said, a whole mine was to be found in England.

Mr. WILLIAM NEILE was desired to produce his theory of motion; which being done, it was read, and ordered to be registered¹. After some discourse upon this theory, the author was desired to complete it, and to consider how to verify his principles by experiments, and to accommodate them to the rules of Dr. WREN and Monfr. HUYGENS; which he promised he would endeavour to do.

Mr. OLDENBURG produced a new book, lately printed at Paris², containing some curious anatomical observations made by the Royal Academy of Sciences there, upon five animals, viz. the camelion, castor, dromedary, bear, and an African deer called by the French *gazelle*.

It was moved, that when any of the beasts or birds of the King died, Mr. MAY might be spoken to by Sir ROBERT MORAY to send them to the society to be dissected.

Mr. BOYLE mentioning, that there was then in London such a deer as the *gazelle* brought from Bantam, was desired, that, if it should die, he would procure it for the society; which he promised to do, if he could.

Mr. AUBREY produced a letter written to him by Mr. FRANCIS POTTER in 1652, signifying, that at that time the writer of it had made some trials of the transfusion of blood.

May 6. Mr. HOOKE produced a new kind of pendulum of his own invention, having a great weight appendant to it, and moved with a very small force; viz. by such a contrivance, that a pendulum of about fourteen feet long, so as a single vibration of it is made in two seconds, with an excussion of half an inch or less, having a weight of three pounds hanging on it, and moved by the sole force of a pocket-watch, with four wheels, shall go fourteen months, and cause very equal vibrations.

He shewed two several contrivances for it; one was with a pin upon the balance of a pocket-watch, making a bifurcated needle to vibrate on one end, and on the other end the pendulum: Another was with a thread fastened on one end to the balance of the watch, and on the other end to the pendulum, and so moving it to and fro.

Dr. WREN suggested a third way, viz. by taking a cylindrical staff of twenty eight feet long, and making it move in its middle on a pin, and hanging an equal weight on each end of it, to be moved with a pocket-watch.

¹ Register, vol. iv. p. 49.

July 1669.

² In 4°. See Philos. Transact. vol. iv. n° 49, p. 991, for

Mr. HOOKE was ordered to cause one to be made for the society, closing the pendulum in a glass-tube with a bolt-head beneath.

He produced his instrument of observing second minutes by the sun, by a small telescope fastened on a board, and casting the picture of the sun, without a penumbra through it, upon an arch of wood covered with white paper, fastened to the opposite side of the board; an instrument of excellent use to observe eclipses. He was ordered to cause the arch to be divided against the next meeting.

Mr. NEILE being called upon about the completing of his Theory concerning the principles of motion, and applying them to the rules given by Dr. WREN and Monfr. HUYGENS for experiments, intimated, that he had begun to accommodate those his principles to the said rules, but not finished it yet. He was desired to bring it in as soon as he had finished it.

Dr. CROUNE intimated, that he hoped he should in a short time give the society an account concerning the success of the experiments of motion, which he had been desired to make, to see, whether they answered the rules given by Dr. WREN, and Monfr. HUYGENS concerning them.

The operator was again ordered to furnish him with the apparatus necessary; and Mr. HOOKE was desired to assist Dr. CROUNE, who said, that at the next meeting a day might be pitched upon for making these experiments in Gresham-college, that so other members of the society, who had leisure, might be present.

Mr. BOYLE presented the society, for the repository, with the skin of a calf with two heads, which, he said, had been lately brought forth alive in England, having two wind-pipes, two lungs, and but one heart, sucking with both mouths.

Dr. CROUNE being put in mind of the experiment of making a circular transfusion of blood in two dogs, said, that something was already done in order to it, and that he would go about it as soon as he could.

He mentioned, that from this experiment it would appear, whether blood nourishes, or not; and added, that this experiment might be carried on, to find, whether one animal might be kept alive without breathing, by the breathing of the other only.

Mr. BOYLE observed upon this, that it would be worth trying, whether air generated of other bodies would not serve for respiration.

Mr. DANIEL COXE mentioned, that CORNELIUS DREBBEL pretended to have a certain liquor, to supply the want of fresh air in the boat, which he had made to go under water with; and which boat was so framed, that it had no bottom, according to the relation given of it in the notes made upon HERNANDES.

Sir ROBERT MORAY mentioned, that Mr. GREATRIX had improved his engine for going under water with; and that by means thereof he could sink himself ten fathoms under water, and stay there with ease enough as long as he pleased, going up and down, stooping and working; but at a much greater depth he found an intolerable pressure.

May 13. The new patent from his Majesty, dated April 8, 1669, granting Chelsea college to the society, together with some additional privileges and powers, was read. It was as follows:

“ CAROLUS SECUNDUS Dei gratia Angliæ Scotiæ Franciæ et Hi-
 berniæ Rex, fidei Defensor, &c. omnibus, ad quos hæc Literæ nostræ patentēs
 pervenerint, salutem. SCIATIS, quod nos de gratia nostra speciali ac ex certa
 scientia et mero motu nostris dedimus et concessimus, ac per præsentēs pro nobis
 heredibus et successoribus nostris damus et concedimus, dilectis et fidelibus
 nostris *Præfidi Concilio et Sociis Regalis Societatis Londini pro scientia naturalis*
promovenda, et successoribus suis in perpetuum, totam illam peciam terræ ara-
 bilis vocatam Teamshott, continentem per æstimationem viginti acras, jacentem
 inter viam nostram ducentem a Westmonasterio versus Chelsey ex parte boreali
 et occidentali; et peciam prati continentem per æstimationem quatuor acras,
 parcellam octodecim acrarum prati nuper in tenura Comitum Nottinghamiensis,
 vel assignatorum suorum, ex parte australi; ac clausum prati vocatum Stone-
 bridge Close ex parte orientali; et peciam terræ arabilis nuper in occupatione
 THOMÆ EVANS, vel assignatorum suorum, ex parte occidentali; per particula-
 ria inde mentionata esse annuā redditus, sive valoris, viginti trium solidorum
 et quatuor denariorum: Nec non totum illum prædictum clausum prati voca-
 tum Stony Bridge Close, continentem per æstimationem quatuor acras, nuper
 in occupatione JOHANNIS DRAKES, vel assignatorum suorum, jacentem inter ri-
 vum vocatum Le Common Sewer ex parte orientali; et prædictam peciam terræ
 vocatam Teamshott ex parte occidentali; et pontem vocatum Stony Bridge ex
 parte boreali; per particularia inde mentionata esse annuā redditus, sive valo-
 ris, viginti solidorum: Nec non totam illam unam peciam terræ arabilis in
 communi campo vocato East Field, continentem per æstimationem tres acras,
 nuper in occupatione THOMÆ FRANCES, vel assignatorum suorum, jacen-
 tem inter prædictam peciam terræ vocatam Teamshott ex parte orientali;
 peciam terræ arabilis nuper in tenura Comitum Lincolnensis, vel assignatorum su-
 orum, ex parte occidentali; parcellam prati de Earles Court Land ex parte australi;
 et viam nostram ducentem a Westmonasterio versus Chelsey prædictam ex parte
 boreali et occidentali; per particularia inde mentionata esse annuā redditus,
 sive valoris, quatuor solidorum (quæ quidem præmissa sunt aut olim fuerunt par-
 cella terræ nostræ in Chelsey, existentis parcellæ terræ Dominicalis Manerii de Chel-
 sey prædictæ, ac nuper fuerunt parcella possessionum JOHANNIS nuper Ducis Nor-
 thumbriæ; et quæ nuper per præcharissimum avum nostrum beati memorie
 JACOBUM Regem per Literas suas patentes, gerentes datum apud Westmonaste-
 rium octavo die Maii, anno regni sui Angliæ octavo et Scotiæ quadragésimo
 tertio, concessa fuerunt, aut mentionata esse concessa, Præposito et Sociis Collegii
 Regis JACOBI in Chelsey prope London ex fundatione ejusdem JACOBI Regis
 Angliæ, et successoribus suis in perpetuum; tenendum de præfato JACOBO
 Rege,

" Rege, ut de manerio suo de East Greenwich in comitatu Cantie, per fidelitatem
 " tantum, in libero et communi soccagio. et non in capite, nec per servitium mi-
 " litare) Ac etiam omnia et singula domus ædificia structuras boscos subboscos ar-
 " boret, ac totam terram fundum et solum eorundem boscorum subboscorum et
 " arborum, ac omnia alia jura jurisdictiones franchiseas privilegia libertates profi-
 " cua commoditates advantagia emolumenta et hereditamenta nostra quæcunque,
 " cum eorum pertinentiis universis, cujuscunque sint generis naturæ seu speciei,
 " seu quibuscunque nominibus sciantur censeantur nuncupentur seu cognoscantur,
 " scituata jacientia et existentia provenientia crescentia renovantia sive emergentia
 " infra comitatum villas campos loca sive hamletas prædictas, vel alibi ubicun-
 " que, prædictis terris et cæteris præmissis vel alicui inde parcellæ quoquo modo
 " spectantia^b: Necnon reversionem et reversiones omnium et singulorum præ-
 " missorum superius per præsentis præconcessorum, et cujuslibet inde parcellæ,
 " dependentes vel expectantes de in vel super aliquam dimissionem vel concessio-
 " nem pro terminu vel terminis vitæ vel vitarum vel annorum, aut aliter de præ-
 " missis superius per præsentis præconcessis seu de aliqua inde parcella quoquo
 " modo factam, existentem de recordo vel non de recordo: Necnon omnia et
 " singula redditus et annualia proficua quæcunque reservata super quibuscunque
 " dimissionibus vel concessionibus de et super præmissa per præsentis præconcessa,
 " vel de et super aliquam inde parcellam. DENIMUS etiam et concessimus, ac
 " per præsentis pro nobis heredibus et successoribus nostris damus et concedimus,
 " præfatis Præfidi Concilio et Sodalibus Regalis Societatis Londini pro scientia
 " naturali promovenda, et successoribus suis in perpetuum, quod ipsi et eorum
 " successores de cætero in perpetuum habeant teneant et gaudeant, ac habere tenere
 " et gaudere valeant et possint, infra præmissa superius per præsentis præconcessa,
 " ac infra quamlibet inde parcellam, tot tanta talia eadem hujusmodi et consimi-
 " lia jura jurisdictiones libertates franchiseas consuetudines privilegia proficua com-
 " moditates advantagia emolumenta et hereditamenta quæcunque, quot quanta
 " qualia et quæ, ac adeo plene libere et integre, ac in tam amplis modo et forma,
 " prout prædictus JOHANNES nuper Dux Northumbriæ, aut prædictus Præpositus
 " et Socii Collegii Regis JACOBI in Chelsey prope London ex fundatione ejusdem
 " JACOBI Regis Angliæ, aut aliquis alius sive aliqui alii, prædicta terras tene-
 " menta et cætera præmissa cum suis pertinentiis, aut aliquam inde parcellam,
 " unquam antehac habentes possidentes aut seisis inde existentes, habens possi-
 " dens aut seisitus inde extens, unquam habuerunt tenuerunt usi vel gavisi fue-
 " runt, habuit tenuit usus vel gavissus fuit, seu habere tenere uti vel gaudere de-
 " buerunt aut debuit, in præmissis superius per præsentis præconcessis, aut ali-
 " qua inde parcella, ratione vel prætextu alicujus chartæ doni concessionis vel
 " confirmationis per nos seu aliquem progenitorum vel antecessorum nostrorum
 " nuper Regum vel Reginarum Angliæ antehac habitorum factorum vel
 " concessorum seu confirmatorum, aut ratione vel prætextu alicujus actus Parlia-
 " menti vel aliquorum actuum Parliamentorum, aut ratione vel prætextu alicujus
 " legitimæ præscriptionis usus seu consuetudinis antehac habitorum seu usitorum,
 " aut aliter quocunque legali modo jure seu titulo, ac adeo plene libere et integre,
 " ac in tam amplis modo et forma, prout nos aut aliquis progenitorum vel ante-
 " cessorum nostrorum nuper Regum vel Reginarum Angliæ prædicta terras tene-

^b Sic in Authent.

" menta et cætera præmissa, aut aliquam inde parcelam, habuimus et gavisi sui-
 " mus aut habuerunt et gavisi fuerunt, seu habere et gaudere debuimus aut ha-
 " bere et gaudere debuerunt aut debuit. DAMUS ulterius, ac per præsentis pro
 " nobis heredibus et successoribus nostris concedimus, præfatis Præsidi Concilio
 " et Sodalibus Regalis Societatis Londini pro scientia naturali promovenda, et eo-
 " rum successoribus, omnia et singula præmissa superius per præsentis præconcessa,
 " cum eorum pertinentiis universis, adeo plene libere et integre, ac in tam amplis
 " modo et forma, prout ea omnia et singula præmissa, aut aliqua inde parcella,
 " ad manus nostras, seu ad manus aliquorum progenitorum vel antecessorum
 " nostrorum nuper Regum vel Reginarum Angliæ, ratione vel prætextu dissolu-
 " tionis vel fursum redditionis alicujus nuper monasterii prioratus sive hospitalis,
 " aut ratione vel prætextu alicujus actus Parlamenti vel aliquorum actuum Parli-
 " amentorum, aut ratione alicujus attincturæ sive forisfacturæ, aut ratione alicu-
 " jus excambii vel perquisitionis, aut alicujus doni vel concessionis, aut ratione es-
 " chaetæ, aut quocunque alio legali modo jure seu titulo deveniunt seu devenire
 " debuerunt, ac in manibus nostris jam existunt seu existere debent vel debuerunt:
 " habendum tenendum et gaudendum prædicta terras tenementa et hereditamenta,
 " ac cætera omnia et singula præmissa superius per præsentis præconcessa, cum
 " eorum pertinentiis universis, præfato Præsidi Concilio et Sodalibus Regalis So-
 " cietatis Londini pro scientia naturali promovenda, et successoribus suis in perpetu-
 " um; tenendum de nobis heredibus et successoribus nostris, ut de manerio
 " nostro de East Greenwich in comitatu nostro Cantie, per fidelitatem tantum, in
 " libero et communi foccagio, et non in capite, nec per servitium militare; ac
 " reddendum annuatim nobis heredibus et successoribus nostris de et pro prædicta
 " terra arabili vocata Teamshott viginti tres solidos et quatuor denarios, ac de et
 " pro prædicto clauso prati vocato Stony Bridge Close viginti solidos, ac de et
 " pro prædicta pecia terræ arabilis in communi campo vocato East Field quatuor
 " solidos legalis monete Angliæ, ad festa Sancti MICHAELIS Archangeli et An-
 " nunciationis beate MARIE Virginis, ad receptam Scaccarii nostri Westmonasterii.
 " heredum et successorum nostrorum, seu ad manus Ballivorum, seu Receptorum
 " præmissorum pro tempore existente¹, per æquales portiones annuatim solvendas
 " in perpetuum. Et ULTERIUS de uberiori gratia nostra speciali ac ex certa
 " scientia et mero motu nostris volumus, ac per præsentis pro nobis heredibus et
 " successoribus nostris concedimus præfato Præsidi Concilio et Sodalibus Regalis
 " Societatis prædictæ et successoribus suis, quod nos heredes et successores nostri
 " de cætero in perpetuum annuatim, et de tempore in tempus, exonerabimus ac
 " quietabimus et indemnes conservabimus, tam præfatos Præsidentem Concilium et
 " Sodales Regalis Societatis prædictæ et successores suos, quam prædicta terras
 " tenementa et cætera omnia et singula præmissa superius expressa et specificata ac
 " per præsentis præconcessa, et quamlibet inde parcelam, cum eorum pertinenti-
 " is universis, de et ab omnibus et omnimodis corrodiis redditibus feodis servitiis
 " annuitatibus pensionibus portionibus ac denariorum summis ac oneribus quibus-
 " cunque de præmissis, seu aliqua inde parcella, nobis heredibus vel successoribus
 " nostris exeuntibus vel solvendis, vel superinde versus nos heredes vel successores
 " nostros oneratis vel onerandis; præterquam de redditibus servitiis et tenuris su-
 " perius in his præsentibus nobis heredibus et successoribus nostris reservatis, ac

¹ Sic in Authent. et passim infra.

præter-

præterquam de dimissionibus et concessionibus de præmissis seu de aliqua inde
 parcella antehac factis, ac conventionibus et conditionibus in iisdem existentibus,
 ac conventionibus et oneribus, quæ aliquis firmarius seu aliqui firmarii
 præmissorum ratione indenturarum et dimissionum suarum facere et exonerare
 renetur seu tenentur. Voluimus etiam, ac per præsentem pro nobis heredibus et
 successoribus nostris firmiter injungendo præcipimus, tam Commissionariis pro
 thesauro nostro, Thesaurario, Camerario, Subthesaurario, et Baronibus Scaccarii
 nostri heredum et successorum nostrorum pro tempore existente, quam omnibus
 et singulis Auditoribus, et aliis officiariis, et ministris nostris heredum et
 successorum nostrorum quibuscunque pro tempore existente; quod ipsi et
 eorum quilibet super solam demonstrationem harum Literarum nostrarum
 patentium, vel irrotulamenti earundem, absque aliquo alio brevi seu warranto
 a nobis heredibus vel successoribus nostris quoquo modo impetrandi
 seu prosequendo, plenam integram debitamque allocationem et exonerationem
 manifestam de et ab omnibus et omnimodis hujusmodi corrosiis redditibus
 leodis pensionibus portionibus et denariorum summis ac oneribus quibuscunque
 (præterquam de servitiis redditibus tenuris ac arreragiis redditibus ac cæteris
 præmissis in his præsentibus, ut præfertur, reservatis, et per præfatos
 Præsidem Concilium et Sodales Regalis Societatis prædictæ et successores suos
 solubilibus sciendis seu performandis) de præmissis per præfatos præconcessis,
 seu de aliqua inde parte vel parcella, nobis heredibus vel successoribus nostris
 exeuntibus seu solvendis, vel superinde versus nos heredes vel successores nostros
 oneratis seu onerandis, præfatis Præfidi Concilio et Sodalibus Regalis Societatis
 prædictæ et successoribus suis facient, et de tempore in tempus fieri causabunt:
 Et hæc Literæ nostræ patentem, vel irrotulamentum earundem, erunt de tempore
 in tempus, tam dictis Commissionariis pro Thesauro nostro, Thesaurario, Cancellario,
 et Baronibus Scaccarii nostri heredum et successorum nostrorum pro tempore
 existente, quam omnibus et singulis Auditoribus, et aliis officiariis, et ministris
 nostris heredum et successorum nostrorum quibuscunque pro tempore existente,
 sufficiens warrantum et exoneratio in hac parte. Et cum nos per Literas
 nostras patentes, gerentes datum apud Westmonasterium vicesimo secundo die
 Aprilis, anno regni nostri decimo quinto, Præfidi Concilio et Sodalibus Regalis
 Societatis prædictæ factas, inter alia concessimus præfatis Præfidi Concilio et
 Sodalibus prædictæ Regalis Societatis, et successoribus suis in perpetuum, quod si
 contingerit Præsidem ejusdem Regalis Societatis pro tempore existente aegritudine
 vel infirmitate detineri, vel in servitio nostro heredum vel successorum nostrorum
 versari, vel aliter esse occupatum, ita quod necessariis negotiis ejusdem
 Regalis Societatis officium Præsidis prædicti tangere non poterit; quod tunc
 et toties bene liceat et licebit eidem Præfidi sic detento versato vel occupato
 unum de Concilio prædictæ Regalis Societatis pro tempore existente, fore et
 esse Deputatum ejusdem Præsidis, nominare et appunctuare: qui quidem Deputatus,
 in officio Deputati Præsidis prædicti sic faciendus et constituendus, sit et
 effectus Deputatus ejusdem Præsidis de tempore in tempus, toties quoties prædictus
 Præfides sic abesse contigerit, durante toto tempore, quo prædictus Præfides
 in officio præsidis continuaverit; nisi interim prædictus Præfides Regalis Societatis
 prædictæ pro tempore existente unum alium de prædicto Concilio ejus Deputatum

Sic in Authent.

tum

tum fecerit et constituerit: Et quod quilibet hujusmodi Deputatus prædicti Præ-
 sidis sic, ut præfertur, faciendus et constituendus omnia et singula, quæ ad officium
 Præsidis prædictæ Regalis Societatis pertinent seu pertinere debent, vel per prædi-
 ctum Præsidentem virtute istarum Literarum nostrarum patentium limitata et appun-
 ctuata fore¹ facienda et exequenda de tempore in tempus, toties quoties prædictus
 Præsides sic abesse contigerit, durante tali tempore, quo Deputatus prædicti Præsidis
 continuaverit, facere et exequi valeat et possit, vigore istarum Literarum nostrarum
 patentium, adeo plene libere et integre, ac in tam amplis modo et forma, prout
 Præsides prædictus, si præsens esset, illa facere et exequi valeat et possit; sacramento
 corporali super sancta Dei Evangelia, in forma et effectu in eisdem Literis nostris
 patentibus specificatis, per hujusmodi Deputatum ad omnia et singula, quæ ad
 officium Præsidis pertinent, bene et fideliter exequendum, coram præfato Con-
 cilio prædictæ Regalis Societatis, vel aliquibus septem vel pluribus eorum, prius
 præstando; et sic toties quoties casus sic acciderit: cui quidem Concilio, vel
 aliquibus septem vel pluribus eorum pro tempore existente, sacramentum præ-
 dictum administrare potestatem et auctoritatem, quoties casus sic acciderit, ded-
 dimus et concessimus per easdem Literas nostras patentes, absque brevi commissio-
 ne sive ulteriori warranto in ea parte a nobis heredibus et successoribus nostris
 procurandis seu obtinendis: Ac quod ipsi et successores eorum, seu aliqui novem
 vel plures eorum (quorum Præsidentem pro tempore existente, vel ejus deputatum,
 semper unum esse volumus) conventus seu congregationes de seipsis pro experi-
 mentorum et rerum naturalium cognitione et indagine alique negotiis ad Soci-
 etatem prædictam spectantibus, quoties et quando opus fuerit, licite facere et
 habere possint in collegio sive aula sive alio loco commodo intra civitatem nos-
 tram London, vel in aliquo alio loco commodo intra decem milliaria ab eadem
 civitate nostra: Et cum diversa et varia res potestates libertates et privilegia in
 iisdem Literis nostris patentibus præfato Præsidi Concilio ac Sodalibus Regalis
 Societatis prædictæ concessa, virtute istarum Literarum nostrarum patentium,
 non sunt exercenda facienda performanda seu exequenda, nisi per prædictum
 Præsidentem et Concilium, aut aliquos septem vel plures eorum: Et cum ulterius
 per prædictas Literas nostras patentes pro nobis heredibus et successoribus nostris
 dedimus et concessimus præfatis Præsidi Concilio et Sodalibus prædictæ Regalis
 Societatis, et successoribus suis in perpetuum, sive aliquibus viginti et uni vel
 pluribus eorum (quorum Præsidentem pro tempore existente, vel ejus Deputatum,
 semper unum esse volumus) seu majori parti prædictorum viginti et unius vel
 plurium, plenam potestatem et auctoritatem de tempore in tempus eligendi no-
 minandi et constituendi unum vel plures Typographos sive Impressores, et
 Chalcographos seu Sculptores, et ipsi vel ipsi per scriptum communi Sigillo
 prædictæ Regalis Societatis sigillatum, et manu Præsidis pro tempore existente
 signatum, facultatem concedendi, ut imprimant tales res materias et negotia
 prædictam Regalem Societatem tangentia vel concernentia, quales prædictis
 Typographo vel Impressori, Chalcographo vel Sculptori, vel Typographis vel
 Impressoribus, Chalcographis vel Sculptoribus, de tempore in tempus per Præ-
 sidentem et Concilium prædictæ Regalis Societatis, vel aliquos septem vel plures
 eorum (quorum Præsidentem pro tempore existente, vel ejus Deputatum, unum
 esse volumus) vel per majorem partem prædictorum septem vel plurium com-

¹ Sic in Authent.

² missa.

" missa " fuerint ; sacramentis suis corporalibus, antequam ad officia sua exercen-
 " da admittantur, coram Præsidente et Concilio pro tempore existente, vel aliquibus
 " septem vel pluribus eorum, prius præstandis ; cui quidem Præsidi et Concilio,
 " vel aliquibus septem vel pluribus eorum pro tempore existente, sacramenta
 " prædicta administrare plenam potestatem et auctoritatem dedimus et concessimus
 " per prædictas Literas nostras patentes ; prout in eisdem Literis nostris paten-
 " tibus, relatione inde habita, plenius liquet et apparet : Nos, de abundantiori
 " gratia nostra speciali ac ex certa scientia et mero motu nostris, DEDIMUS et con-
 " cessimus, ac per præsentem pro nobis heredibus et successoribus nostris damus et
 " concedimus, præfatis Præsidi Concilio et Sodalibus prædictæ Regalis Socie-
 " tatis, et successoribus suis in perpetuum, quod de cætero in perpetuum, si con-
 " tingerit Præsidem ejusdem Regalis Societatis pro tempore existente ægritudine
 " vel infirmitate detineri, vel in servitio nostro heredum vel successorum nostro-
 " rum versari, vel aliter esse occupatum, ita quod necessarius negotiis ejusdem
 " Regalis Societatis officium Præsidis tangentibus attendere non poterit ; quod
 " tunc et toties bene liceat et licebit eidem Præsidi sic detento versato vel occu-
 " pato unum de Concilio prædictæ Regalis Societatis pro tempore existente, fore
 " et esse Deputatum ejusdem Præsidis, nominare et appunctuare ; qui quidem
 " Deputatus, in officio Deputati Præsidis prædicti sic faciendus et constituendus,
 " sit et erit Deputatus ejusdem Præsidis de tempore in tempus, toties quoties præ-
 " dictus Præses sic abesse contingerit, durante toto tempore, quo prædictus Præses
 " in officio Præsidis continuaverit, etiamsi interim Præses Regalis Societatis præ-
 " dictæ pro tempore existente unum alium vel plures alios de prædicto Concilio ejus
 " Deputatum et Deputatos fecerit et constituerit ; cui quidem Præsidi pro tem-
 " pore existente duos vel plures de prædicto Concilio ejus Deputatos ipso et eod-
 " em tempore facere et constituere potestatem et auctoritatem, quoties ei pla-
 " cuerit, damus et concedimus per præsentem pro nobis heredibus et successoribus
 " nostris : Et quod quilibet hujusmodi Deputatus et Deputati prædicti Præsidis
 " sic, ut præsertur, faciendi et constituendi omnia et singula, quæ ad officium
 " Præsidis prædictæ Regalis Societatis pertinent seu pertinere debent, vel per præ-
 " dictum Præsidem virtute prædictarum Literarum nostrarum paten-
 " tium, limitata et appunctuata fore " facienda et exequenda de tempore in tempus,
 " toties quoties prædictus Præses sic abesse contingerit, durante tali tempore, quo
 " Deputatus et Deputati prædicti Præsidis continuaverit et continuaverint, facere et
 " exequi valeat et possit valeant et possint, vigore harum Literarum nostrarum
 " patentium, adeo plene libere et integre, ac in tam amplis modo et forma, prout
 " Præses prædictus, si præsens esset, illa facere et exequi valeret et posset ; sacra-
 " mento corporali super sancta Dei Evangelia, in forma et effectu in eisdem
 " Literis nostris patentibus specificatis, per hujusmodi Deputatum et Deputatos
 " ad omnia et singula, quæ ad officium Præsidis pertinent, bene et fideliter exe-
 " quendum, coram præfato Concilio prædictæ Regalis Societatis, vel aliquibus
 " quinque vel pluribus eorum, prius præstando ; et sic toties quoties casus sic
 " acciderit : cui quidem Concilio, vel aliquibus quinque vel pluribus eorum pro
 " tempore existente, sacramentum prædictum administrare potestatem et autho-

" Sic in Authen.

* Ibid.

" ritatem

"titatem, quoties casus sic acciderit, damus et concedimus per præsentēs, absque
 "breui commissione sive ulteriori warranto in ea parte a nobis heredibus et suc-
 "cessoribus nostris procurandis seu obtinendis: Ac ulterius, quod de cætero in
 "perpetuum ipsi et successores eorum, seu aliqui novem vel plures eorum (quo-
 "rum Præsidentem pro tempore existentē, vel ejus Deputatum, semper unum esse
 "volumus) conventus seu congregationes de seipsis pro experimentorum et rerum
 "naturalium cognitione et indagine aliisque negotiis ad Societatem prædictam
 "spectantibus, quoties et quando opus fuerit, licite facere et habere possint in
 "collegio sive aula sive alio loco commodo infra regnum nostrum Angliæ: Ac
 "ulterius, quod omnia et singula res potestates libertates et privilegia in prædictis
 "Literis nostris patentibus præfatis Præsidi Concilio et Sodalibus Regalis Socie-
 "tatis prædictæ concessa, virtute istarum Literarum nostrarum patentium, quæ
 "non sunt exercenda facienda performanda seu exequenda, nisi per prædictum
 "Præsidentem et Concilium, aut aliquos septem vel plures eorum; de cætero in per-
 "petuum exerceri fieri performari seu exequi possint et valeant per prædictum
 "Præsidentem et Concilium, aut aliquos quinque vel plures eorum. AC ULTERIUS
 "de uberiori gratia nostra dedimus et concessimus, ac per præsentēs pro nobis
 "heredibus et successoribus nostris damus et concedimus, præfatis Præsidi Con-
 "cilio et Sodalibus prædictæ Regalis Societatis, et successoribus suis in perpetuum,
 "quod de cætero in perpetuum bene liceat et licebit Præsidi Regalis Societatis
 "prædictæ pro tempore existente, de tempore in tempus eligere nominare et con-
 "stituere aliquem vel aliquos Typographum sive Impressorem, Typographos sive
 "Impressores, et Chalcographum seu Sculptorem, Chalcographos seu Sculptores,
 "et ipsi vel ipsi facultatem concedere, ut imprimant tales res materias et nego-
 "tia prædictam Regalem Societatem tangentia vel concernentia, quales præ-
 "dictis Typographo vel Impressori, Chalcographo seu Sculptori, vel Typographis
 "vel Impressoribus, Chalcographis vel Sculptoribus, de tempore in tempus per
 "Præsidentem et Concilium prædictæ Regalis Societatis, vel aliquos quinque vel
 "plures eorum (quorum Præsidentem pro tempore existentē, vel ejus Deputatum,
 "unum esse volumus) vel per majorem partem prædictorum quinque vel plurium
 "commisissæ fuerint; sacramentis suis corporalibus, antequam ad officia sua exer-
 "cenda admittantur, coram Præsidente et Concilio pro tempore existente, vel ali-
 "quibus quinque vel pluribus eorum, prius præstandis; et sic toties quoties casus
 "sic acciderit: cui quidem Præsidi et Concilio pro tempore existente, vel aliqui-
 "bus quinque vel pluribus eorum, sacramenta prædicta administrare plenam po-
 "testatem et auctoritatem damus et concedimus per præsentēs. ET ULTERIUS
 "volumus, ac per præsentēs pro nobis heredibus et successoribus nostris concedimus
 "præfatis Præsidi Concilio et Sodalibus Regalis Societatis prædictæ et successoribus
 "suis, quod hæc Literæ nostræ patentēs, vel irrotulamentum earundem, stab-
 "bunt et erunt in omnibus et per omnia bonæ firmæ valide sufficientes et effe-
 "ctuales in lege ad omnes respectus proposita construtiones et intentiones erga et
 "contra nos heredes et successores nostros, tam in omnibus curiis nostris, quam
 "alibi infra regnum nostrum Angliæ, absque aliquibus confirmationibus licentiis vel
 "tolerationibus de nobis heredibus vel successoribus nostris quoquo modo in poste-
 "rum procurandis aut obtinendis. NON OBSTANTE male nominando vel male reci-
 "tando aut non recitando prædicta terras tenementa et cætera præmissa, vel aliquam
 "inde parcellam. Et non obstante non inveniundo officium aut inquisitionem præmis-
 "

" forum, aut alicujus inde parcellæ, per quæ titulus noster inveniri debuit, ante
 " confectionem harum Literarum nostrarum patentium. Et non obstante male
 " recitando vel non recitando aliquam dimissionem vel concessionem de præmissis
 " vel de aliqua inde parcella factam, existentem de recordo vel non de recordo. Et
 " non obstante male nominando vel non nominando aliquam villam hamletam
 " parochiam locum vel comitatum, in quibus præmissa vel aliqua inde parcella
 " existunt vel existit. Et non obstante, quod de nobis tenentium firmariorum sive
 " occupatorum præmissorum, vel alicujus inde parcellæ, plena vera et certa non
 " sit nentio. Et non obstante aliquibus defectibus * de certitudine vel computa-
 " tione aut declaratione veri annui valoris præmissorum, aut alicujus inde par-
 " cellæ; aut annualis redditus reservati de et super præmissis, vel de et super
 " aliqua inde parcella, in his Literis nostris patentibus expressis et contentis. Et
 " non obstante statuto in Parlamento Domini HENRICI nuper Regis Angliæ sexti
 " progenitoris nostri, anno regni sui decimo octavo, facto et edito. Et non obstante
 " aliquibus aliis defectibus †, in non certe nominando naturam genus speciei ‡ quan-
 " titatem aut qualitatem præmissorum, aut alicujus inde parcellæ. Et non ob-
 " stante statuto de terris et tenementis ad manum mortuam non ponendis; aut
 " aliquo alio statuto actu ordinatione proclamatione provisione sive restrictione in
 " contrarium inde antehac habitis factis editis ordinatis seu provis, in aliquo non
 " obstante. SALVO tamen ANDRÆ COLE Armigero et omnibus aliis personis
 " quibuscunque, præterquam nos heredes et successores nostros, talia sua clameum
 " interesse et demanda quæcunque; qualia ipse vel ipsi seu eorum aliquis habet
 " seu habeant, aut de jure habere debent, de et in præmissis, seu aliqua parte
 " vel parcella inde. Et ULTERIUS volumus, et per præsentem pro nobis here-
 " dibus et successoribus nostris ordinamus et firmiter injungendo præcipimus,
 " quod Præses Societatis prædictæ pro tempore existente, et Deputati ejus, ante-
 " quam ipsi aut eorum aliqui ad executionem officii illius admittantur, tam sa-
 " cramentum corporale communiter vocatum *The oath of obedience*, quam sacramen-
 " tum corporale communiter vocatum *The oath of supremacy*, super sacrosanctis
 " Dei Evangelii præstabunt, et eorum quilibet præstabit, coram Concilio ejusdem
 " Societatis, aut aliquibus septem vel pluribus eorum; cui quidem Concilio, aut
 " aliquibus septem vel pluribus eorum, sacramenta prædicta administrare pro
 " nobis heredibus et successoribus nostris plenam potestatem et autoritatem de
 " ten pore in tempus, quotiescunque opus fuerit, damus et concedimus per præ-
 " sentem. PROVISIO semper, et voluntas et intentio nostra regia est, quod terræ et
 " præmissa prædicta per præsentem, ut præfertur, concessa, seu eorum aliqua, non
 " alienabuntur vel vendentur alicui personæ sive aliquibus personis quibuscunque,
 " aliquo in præsentibus contento in contrarium inde non obstante. Eo, quod
 " expressa mentio de vero valore annuo vel de certitudine præmissorum sive
 " eorum alicujus, aut de aliis donis sive concessionibus per nos seu per aliquem
 " progenitorum sive prædecessorum nostrorum præfatis Præfidi Concilio et Soda-
 " libus Regalis Societatis de London, et successoribus, ante hæc tempora factis,
 " in præsentibus minime facta existit; aut aliquo statuto actu ordinatione provi-
 " sione proclamatione sive restrictione in contrarium inde antehac habitis factis
 " editis ordinatis sive provis, aut aliqua alia re causa vel materia quæcunque, in

* Sic in Authent.

† Sic ibid.

‡ Sic ibid.

§ Sic ibid.

" aliquo.

" aliquo non obstante. IN cujus rei testimonium has Literas nostras fieri fecimus patentes. TESTE Me ipso apud Westmonasterium, octavo die Aprilis, anno regni nostri vicesimo primo.

" Per breve de privato Sigillo.

" P I G O T T."

May 20. At a meeting of the COUNCIL were present

The President

The lord HENRY HOWARD

Mr. AERSKINE

Sir ROBERT MORAY

Sir GILBERT TALBOT

Sir GEORGE ENT

Sir THEODORE DE VAUX

Dr. GODDARD

Dr. CLARKE

Mr. HENSHAW

Mr. EVELYN

Mr. COLWALL

Mr. OLDENBURG.

The president took the oaths of allegiance and supremacy according to the import of the additional charter.

He then nominated and constituted Sir ROBERT MORAY and Dr. GODDARD as two vice-presidents, by virtue of the same charter, giving power to the president to appoint as many vice-presidents out of the council, as he shall think proper. Their two likewise took the said oaths of allegiance and supremacy.

It was ordered, that the ten pounds, advanced by the treasurer to THOMAS WILLISEL, as part of the thirty pounds appointed him by the council for one year, be allowed him upon his account; the payment to begin the 25th of March preceding.

The form of a certificate from the council for the said WILLISEL was read, and ordered to be reviewed by Mr. HOSKYNs, and upon the president's approbation sent away to the said WILLISEL.

It was ordered, that the lord BRERETON, Mr. CHARLES HOWARD, Mr. AERSKINE, Sir ROBERT MORAY, Mr. EVELYN, Mr. HENSHAW, and Mr. HOSKYNs, or any three or more of them, be a committee to consider of the improvements to be made of his Majesty's grant of Chelsea-college, by discovering what may belong to it, by conferring with Mr. CHENEY about those acres, which he had yet in lease of the land of that college, and by commuting parcels of land with the same, in case he should surrender his interest upon equitable terms to the Royal Society: and that the said committee do meet at the lord BRERETON's lodgings in Channel-Row, beginning to do so on the Saturday following at five in the evening; and that they make a report to the council.

Sir THEODORE DE VAUX renewing the motion formerly made concerning the exchange of the manuscripts in the Arundelian-library, bestowed by the lord

B b b 2

HOWARD

HOWARD upon the society, the council adhered to their former vote, and the said lord HOWARD declared, that as he had formerly left to the council the full disposal of that library, so he did still, desiring only, that it might not be imputed to him, as if he were a hinderer of that exchange, he being indifferent, either to the keeping them for the society, or the exchanging them with the university of Oxford.

N^o. 47 of the *Philosophical Transactions* was licensed.

At a meeting of the SOCIETY on the same day,

Mr. HOOKE produced again his magnetical watch so improved, as he said, that it should move in all positions, with any kind of motion, without stopping, or being disturbed. He communicated the way of this improvement to the president, being not yet free to declare it in public, till he had brought it to perfection.

It was again ordered, that a minute-hand should be fitted to it, to see the equality of the vibrations.

Dr. HOLDER's book, intitled, *The Elements of Speech*, was presented to the society by the author.

Sir THEODORE DE VAUX produced out of Sir THEODORE MAYERNE's collection a paper dated June 17, 1647, containing an account of an accident, which happened to one Mr. JOHN STEVENSON, who swallowed a bodkin, and after keeping it six weeks in his stomach voided it by the anus. It was read, and ordered to be kept on the file.

Dr. BALLE presented a small tract in Italian, written by Dr. DONATO ROSETTI of Leghorn, containing demonstrations, as the author pretended, of some paradoxical propositions formerly published, viz. about the cause of æquilibriums; about floating bodies; a vacuum; the absolute weight of the whole air, or any part thereof; the height of the atmosphere, and the way of experimenting, whether light is moved in any sensible time at the distance of forty or more miles. The president took the book with him to peruse; after which it was ordered to be put into the society's library.

Dr. BALLE likewise presented two other small tracts published in Italian, the one by the same ROSETTI, by way of letter to Signor FRACASSATI, concerning æquilibriums; the other by DEIGO ZERILLI, in confirmation of an opinion of JOHN ALFONSO BORELLI against STEPHANO DE GL'ANGELI, concerning some proposition advanced by BORELLI in his book *de vi percussionis*, c. 14.

Mr. OLDENBURG produced divers particulars sent him out of Portugal for the society by Sir ROBERT SOUTHWELL and HIERONYMO LOBO a Jesuit, and GABRIEL

? Printed at London 1669, in 8vo.

GRISLEY,

GRISLEY, a German physician, at Lisbon, accompanied with three letters, one from Sir ROBERT SOUTHWELL, dated March ⁶/₁₆, 1669¹; the second in Latin from father LOBO dated October 1, 1668²; and the third in Dutch from the German physician, dated March 15, 1669.

The particulars sent with these letters were,

1. A printed book in the Portuguese language, intitled, *Historia Geral de Aethiopia a alta, composta na mesma Aethiopia pelo padre MANSEL D' ALMEYDA*; *abreviada con nova releycam e methodo pelo BALTHEZAR TELLES*, &c. printed at Coimbra in 1666, in folio.

2. Divers curiosities of seeds, nuts, reputed vipers-tongues, &c. according to the following lists:

- | | | |
|--|---|--------------------|
| 1. Some Taroco nuts | } | These from Angola. |
| 2. Two Angola onions | | |
| 3. Some vipers-tongues | | |
| 4. A tooth of the beast emgala | | |
| 5. Some black seeds, like beans of the tree sapucaya | } | These from Brasil. |
| 6. Maracoya-seeds | | |
| 7. Seeds of the sensitive plant | | |
| 8. Quintessence of tobacco | | |
| 9. Two coco-nuts | | |
| 10. Some Brasil chefnuts | | |
| 11. A root and stalk, which being masticated draws rheum | | |
| 12. Arbor corall | | |
| 13. Cistus mas 1 Clusii | | |
| 14. Cistus mas 2 Clusii | | |
| 15. Cistus ledon 1 Clusii | } | These, &c. |
| 16. Cistus ledon 4 Clusii | | |
| 17. Cistus ledon 5 Clusii | | |
| 18. Stramonium five Datura folio albo | | |
| 19. Thymelea | | |
| 20. Lentiscus | | |
| 21. Laurus Americana | | |
| 22. Jasminum Polemonium Monspelienfe dictum | | |
| 23. Zizyphus alba | | |
| 24. Jasminum Indicum flore buteo odoratissimo | | |
| 25. Cistus foemina | } | |
| 26. Alcea Japonensis flore pleno mutabili | | |

¹ Letter-Book, vol. iii. p. 38.

² Ibid. p. 40.

- 27. Juniporus major Clusii
- 28. Melopepo melionis notæ
- 29. Acaju Britannicum
- 30. Maracaju Brasilianum
- 31. Admirabilis Peruana flore vario
- 32. Fœniculum dulce Azoricum
- 33. Hyacinthus tuberosus Indicus duas
cebellas habens

These were sent by Dr. GABRIEL GRISLEY, who also sent with them a written catalogue of such plants, as he had always in his reach; as also a printed catalogue of the plants of Portugal.

Of these seeds and bulbs Mr. OLDENBURG was desired to distribute some to Mr. CHARLES HOWARD of Norfolk and to Mr. EVELYN, that they might try, whether they would grow in this climate.

Mr. OLDENBURG was desired to return the society's thanks to Sir ROBERT SOUTHWELL, father LOBO, and Dr. GRISLEY^a.

May 27. Mr. HOOKE produced again his magnetical watch with a minute-hand upon it; which being tried was found not to go very just; the cause of which defect was conceived to be in the pinion, that carried the hand: which defect was ordered to be amended.

Some inquiries were read, which had been drawn by Mr. OLDENBURG out of several authors; and a paper formerly brought in by Sir THEODORE DE VAUX, concerning Barbary, to be recommended to the lord HENRY HOWARD of Norfolk, who was going ambassador to the emperor TAFIETTA. These were approved of, and the following additions made to them.

1. Whether *granum Nubie* will kill in a less quantity than any other known poison?
2. Whether they have any poison, that will kill by smell; and, if so, what that is?
3. What beasts of prey they have, and the manner of catching them?
4. What kind of dogs they have? and what games they are inclined to?
5. To take the longitude and latitude of the places, as they travel.

Mr. OLDENBURG acquainted the society, that the physician of the Prince of Tuscany, Signor JOHN BAPTISTA GORNIA, present at this meeting, had delivered to him some philosophical and medical queries concerning the qualities of mercury and its use in the iliac-passion, sent him from Florence by one of the chief physicians of that place, Signor ALESSANDRO SIGNI: which queries it was humbly desired might be recommended by the society to the consideration of some of the philosophers and physicians of their own body for an answer thereto; which the

^a His letters to them are entered in the Letter-Book, vol. iii. p. 95, 96, 97. ^b Regnier, vol. iv. p. 60. laid

said Signor SIGNI would receive as a great favour, he being engaged in a contest about this matter with another physician at Florence.

Those queries were ordered to be read, and they were as follow, with the case occasioning them :

“ Dum in ilià passione propinatur argentum vivum naturale ad pondus libræ unius, præmissis præmittendis tum pro fecum duritie et siccitate, tum pro subsecutâ intestinorum inflammatione, quæritur,

“ 1. Utrum ejusmodi Mercurius natus sit suapte naturâ venenum ?

“ 2. Utrum, si moram ille traxerit in corpore animali per duos tresve dies, exinde possit venenatam adedò sive corrosivam induere qualitatem, ut lethalis evadat ?

“ 3. Utrum idem Mercurius dosi supra dictâ in ilià passione exhibitus, præmissis semper præmittendis, et agro jam pro deplorato habito, sit accommodatum remedium ?”

This gave occasion of much discourse, some members affirming, that it was frequently given both to children and grown persons without any hurt : Others intimating, that it deserved to be considered, that it causeth so odd an effect as fluxing or salivating ; as also that it is used for the killing of all sorts of worms in human bodies ; on which accounts it seems to have some poisonous quality in it.

SIR ROBERT MORAY related, that in the King's laboratory some mercury being put into a bolt-head with a flat bottom, and the air being exhausted, the mercury had risen much more easily than otherwise ; which shewed, that things may be digested by that way without the danger of breaking glasses, which frequently happens by the expansion of air, though perhaps it is imputed to other causes.

MR. BOYLE remarked, that two very able physicians of his acquaintance gave to a woman desperately sick of the iliac passion above a pound of crude quicksilver, which remained several days in her body without producing any fatal symptom ; and afterwards dissecting the dead corps, they found, that part of her gut, where the excrement was stopped, gangrened ; but the quicksilver lay all on a heap above it, and had not so much as discoloured the parts of the gut contiguous to it.

After these and the like discourses it was ordered, that the physicians of the society, and particularly SIR GEORGE ENT, DR. GODDARD, DR. CLARKE, DR. ALLEN, (the three last of whom were present) should be desired to consider of the abovementioned queries, meeting at SIR GEORGE ENT's house, and to make a report of the result of their disquisition to the society, in order to the returning of an answer to the Florentine physician, who had desired it. Whereupon copies of those queries were ordered to be made for those four physicians, which the amanuensis should see delivered to them.

Mr. OLDENBURG read a letter to him from Monfr. HUYGENS dated at Paris May 29, 1669, N.S.^a, containing his opinion of Mr. HOOKE's new method of moving great pendulums with the force of a small pocket-watch; as also his offer of communicating to the society a new way of his own contrivance to print things written and geometrical figures with little cost and great expedition; a specimen of which accompanied this letter.

Mr. OLDENBURG was desired to return the society's thanks to Monfr. HUYGENS, and to acquaint him^a, that there were several members, who had upon this occasion affirmed, that they had inventions of the like nature, of which trials should be made, and a specimen sent to him; and that he should thereupon be requested to communicate his method.

June 3. At a meeting of the COUNCIL were present

The President

The lord HENRY HOWARD
Sir PAUL NEILE
Sir THEODORE DE VAUX
Dr. CLARKE
Mr. COLWALL

Mr. EVELYN
Sir GEORGE ENT
Dr. GODDARD
Mr. OLDENBURG.

The Latin preface composed by Mr. OLDENBURG, and to be prefixed to Signor MALPIGHI's dissertation on the silk-worm, was read, and approved.

It was ordered, that a salary of forty pounds a year be allowed to Mr. OLDENBURG, one of the secretaries of the society, from the time, that the last present was ordered to him^b.

At a meeting of the SOCIETY, on the same day,

Sir GILBERT TALBOT presented the society with two models of winding stairs, one of which was single, the other double, from some ingenious persons at Hamburgh, who were not named.

Dr. GODDARD's paper, in answer to the Florentine queries brought in at the last meeting, concerning the fitness of mercury for the cure of the iliac passion, was read and recommended to the other physicians named at that meeting, to consider of it, and to make such additions or alterations in it, as they should think proper; which being done, it was ordered to be sent to Florence, as an answer of those physicians, who were present at the society, when those queries were proposed by Signor GORNIA.

Mr. OLDENBURG read three letters, written to him, one by Dr. THOMAS

^a Letter-Book, vol. iii. p. 80.

1669, is in the Letter Book, vol. iii. p. 50.

^b Mr. OLDENBURG's letter, dated May 31,

April 27, 1668.

BROWNE from Norwich, May 29, 1669^{*}; the second by Dr. EDWARD BROWN from Vienna, April 20, 1669[†], inclosed in the preceding, and containing an account of some observations made in Hungary; and the third by Monfr. SLUSIUS from Leige May 26, 1669[‡], communicating his judgment on Mr. MERCATOR's Logarithmo-technia, sent him by Mr. OLDENBURG, and his general method for demonstrating the nature of the cycloid and infinite cycloidical figures. This last letter was recommended to the perusal and consideration of the president, who was desired to inform the society of the import of it.

The queries concerning Barbary were delivered to the lord HOWARD, with a desire, that he would endeavour to procure an answer to them; and they were ordered to be registered[§].

There was produced the model of an engine, contrived by Dr. WREN for the grinding hyperbolicall glasses. But there being made some objections to it, viz. 1. That it would scarce work any such glasses without rings. 2. That the glasses would not come off well polished; the farther discourse of it, and of making trials with it, was deferred, till the inventor himself should be present to demonstrate and explain it, and to clear it from objections.

Mr. HOOKE mentioned, that he had a method of grinding elliptical glasses, which he would shortly communicate.

Dr. CROUNE being called upon concerning the experiments of transfusion and those of motion, said, that he had wanted hitherto the hands of the operator, who was therefore ordered anew to defer no longer the furnishing of all the necessaries for those experiments, nor his attendance at such times, as should be convenient for Dr. CROUNE.

June 10. At a meeting of the COUNCIL were present

The President

The lord BRERETON
Mr. AERSKINE
Sir ROBERT MORAY
Sir PAUL NEILE
Sir GEORGE ENT
Sir THEODORE DE VAUX

Dr. GODDARD
Mr. EVELYN
Mr. COLWALL
Dr. CLARKE
Mr. HENSHAW
Mr. OLDENBURG.

Mr. HOSKYNs made a report of what was done by the committee appointed May 20, 1669, for improving Chelsea-college, as follows:

“ At a committee of the Royal Society for improving Chelsea-college, &c. at

^{*} Supplement to the Letter-Book, vol. ii. p. 114.

[†] Letter-Book, vol. iii. p. 68.

[‡] The copy of this letter in the Letter-Book, Vol. II.

vol. iii. p. 83, has the date May 31.

[§] Register, vol. iv. p. 50. The answers to

them were read to the society March 28, 1672.

“ the lord BRERETON’s lodgings May 22, 1669, in pursuance of an order of the council of the 20th past, resolved to

“ Query the charter, and what is by this last granted to the society of the rights and possessions of the late college; and how far grantable?

“ Item, Query, the map of the scite of the said college, and its lands; which map is in the hands of Sir ANTHONY MORGAN’s executors, or Mr. COLE, or Mr. CHENEY.

“ Item, Query, the book of the said college printed, and lately in Sir ANTHONY MORGAN’s custody?

“ Item, Query, the paper of bringing Uxbridge river to London of Mr. PACKER; and whether the liberty and power of bringing that river were granted to the said college, and the act of parliament to that purpose?

“ Item, Query, the patent for making collection for voluntary contributions throughout the nation, for advancing the said college; and what was collected, and in whose hands the same is?

“ Item, the lord BRERETON is desired to learn from Dr. WILKINSON by means of Mr. CHENEY, what donations have been made to the said college; and what is become of the library?

“ Item, Query, the patents, that Sir ANTHONY MORGAN mentions, but could not find, made to the said college?”

The lord BRERETON reported*, that Mr. CHENEY would be ready to treat with the society about a year hence, when it would be in his power, the land to be treated about being now leased out.

It was ordered, that the council of the Royal Society, or three or more of them, be a committee, to consider of the most convenient and effectual way to carry on the business of the society; and that they meet the first time at the house of the lord viscount Brouncker on the Monday following at five in the afternoon.

The certificate for THOMAS WILLISSEL, drawn up by Mr. HOSKYNs, was read and approved, as follows:

“ These are to certify all, whom it may concern, that the bearer hereof, THOMAS WILLISSEL, is at present employed by the president, council and fellows of the Royal Society of London for improving natural knowledge, to go into several parts of his Majesty’s dominions for purposes suitable to their institution, according to authority unto them on this behalf given by his sacred Majesty,

* See the Minutes of the Council of May 20, 1669.

“ that

“ that now is : And they earnestly recommend him to all generous and ingenuous spirits, desiring, that as occasion shall require, they will assist him in promoting a work so generally beneficial to all mankind. In witness whereof the said president, council, and fellows of the Royal Society have herunto caused their common seal to be affixed this day of

At a meeting of the Society, on the same day,

Dr. CHRISTOPHER WREN explained the model of his engine for grinding hyperbolic glasses, viz. upon what geometrical principle it depends, and how that is to be applied to practice. The president affirmed, that he had considered the principle, it being formerly imparted to him, and had found it mathematically true; and as to its application to use, the success of that depended upon experiment. The contrivance was, that in this engine there was a complication of three different motions, whereby three bodies so work upon one another, as to produce an hyperbolic figure; any irregularity, made by the encountering of one another, being immediately rectified. Dr. WREN intimated, that great care must be had in setting the engine, that being somewhat nice, since the three axes must all intersect in a point, and one at right angles with the other two.

It was ordered, that the paper containing the demonstration of this should be registered^a, and an engine be made by the care of Mr. Hooke, to try the principle in matter.

Mr. Hooke produced the model of another engine contrived by himself, so as to work a glass into any elliptical or hyperbolic figure assigned, by two motions, one upon the centers, the other upon a flat.

Some objections were made against it; but an engine was ordered to be made for trial.

Dr. GODDARD produced again his paper, answering the three Florentine queries concerning mercury, as it had been reviewed by the other physicians; and it being read and approved of, it was ordered, that Mr. OLDENBURG should be desired to see it transmitted to Florence, and to signify to the person concerned, that the said queries having been proposed at the society by Signor GORNIA, physician to the prince of Tuscany, the society had committed them to the consideration of the physicians present at that time, who had given this answer thereto; which was ordered to be registered^b, as follows:

“ Dum in iliâ passione propinatur Mercurius natus ad pondus libræ unius, præmissis prædictis requisitis, cum pro sæcæ duritiæ et siccitate, tum pro subsecutâ intestinorum inflammatione, inquiritur,

^a Register, vol. iv. p. 51. It is published in June 1669.
the Philos. Transact. vol. iv. n° 48, p. 961, for ^b Register, vol. iv. p. 65.

" 1. Utrum idem Mercurius naturalis sit suapte naturâ venenum ?

" 2. Utrum, si moram traxerit in corpore vivo per duos trefve dies, exinde possit adeo venenatam sive corrosivam qualitatem induere, ut inde lethalis evadat ?

" 3. Utrum idem Mercurius eadem dosi in iliaca passione propinatus, semper præmissis præmittendis, et agro jam pro deplorato habito, sit remedium conveniens ?

" Ad Primam Questionem Responsio.

" 1. Mercurius natus sive crudus, in exhalationes vi caloris elevatus, paralyfin vel stuporem induere potest ; ut in iis, qui vasa argentea, et alia, ex metallo viliori fabrefacta, deaurare solent, aliquando conspicitur ; uti etiam de operariis, qui in argenti vivi fodinis occupati sunt, perhibetur. Eundem, unguentis permistum et corpori inunctum, vel aliter exterius applicatum, pyralismum seu salivationem (piæter alvi fluxum quandoque) excitare compertum est : neutrum tamen horum eundem, licet ad libræ quantitatem propinatum, ut in iliacâ passione sæpius factum, efficere observatum est ; nec, licet post Mercurium crudum, in hoc morbo exhibitum, sæpius ægrum interiisse contigerit, id à Mercurio potius quàm vi morbi accidisse, ulla ratione unquam constitit ; uti neque quàm à Mercurio vivo devorato extinctum fuisse. Quum autem stupor et paralyfis à Mercurio, minutissimis corpusculis corpus ingresso (ut quando exhalatio ejus, vi caloris elevata, inspiratione trahitur) et postea in majores particulas (quæ reverâ globuli minuti admodum sunt) unito, et nervosi generis fibrillas premente, fieri possit ; haud majori jure idem Mercurius suapte naturâ venenum, quàm corpus quodvis durum, membrum corporis aliquod exterius premens, eique stuporem inducens, pro veneno habendum videtur. Quumque dicta salivatio, tempestivè excitata, morbis curandis et sanitati restituendæ apta sit ; hujus effectus nomine multo minùs Mercurius venenis accensendus videtur ; nisi purgantia vel maximè benigna, ut rhubarbarum, sena, &c. quòd diarrhæas concitent, pari jure pro venenis reputanda sint. Videtur ergo, ex ejus effectibus, hæcenus notis, Mercurium nativum suapte naturâ venenum esse, non liquere.

" Ad secundam. Supponere videtur quæstio secunda, Mercurium extra corpus qualitate adeo venenatâ seu corrosivâ præditum non esse, ut inde lethalis evadat, sed per duorum vel trium dierum in corpore moram, talem induere possit. Qualitatem venenatam quod spectat, nondum inter philosophos vel Medicos convenit, in quo ejus essentia consistat, vel quod discrimen statuendum, sive quis terminus ponendus sit, inter id, quod corpori merè noxium quovismodo, et id, quod venenatum habendum sit. Certè, quod quantitate spectabili, sine vitæ discrimine, corpori ingeri potest, venenum minimè reputandum videtur ; ut de Mercurio crudo satis exploratum est. Corrosivam qualitatem quod spectat, tantùm abest ut eam obtineat Mercurius natus, ut spiritus chymicos maximè corrosivos, v. g. vitrioli, nitri, salis, &c. efficaciter obtundat ; adeò ut Mercurio commixti, intra corpus assumi tuto possint ; id quod constat ex Mercurio dulci dicto, (ejusdem præparatione maximè notâ et usitatâ) qui permiscetur spirituum,

"rituum, corrosivorum dictorum, dimidium ejus quantitatis, quam Mercurius
 "sublimatus continet; et qui in mediocri dosi, tantum ejusmodi spirituum in se
 "habet, quantum, nisi tali modo retunderetur vel aliter dilueretur, in corpus as-
 "sumi tutò non possit. Si igitur humori, vel materiæ alicui in corpore corro-
 "sivæ seu acri, jungatur Mercurius crudus, ejus acrimoniam retundere potius,
 "quam acrimoniam exinde sibi acquirere aptus est. Et quâ aliâ ratione venena-
 "tam seu corrosivam qualitatem biduanâ vel triduanâ in corpore morâ induere
 "possit, intellectu haud facile est.

"Ad tertiam. Scitè admodum Celsus; nihil interest, quàm sit tutum præsi-
 "dium, quod est unicum: ideoque in iliaca passione, præmissis præmittendis, aliis-
 "que omnibus cum ratione, frustra licet, tentatis, ut æger jam pro deplorato
 "habeatur; mercurius crudus propinatus videtur conveniens remedium; utpote
 "à quo, licet non semper, aliquando tamen levamen sensitse ægros compertum
 "sit: et quantitatem quod spectat, quum omnis ejus noxa (siqua talis contigerit)
 "corpori illata, ab eodem in corpuscula minutissima soluto pendeat, cui vel
 "unica drachma hac ratione sufficere potest; quumque mole vel pondere exiguo,
 "in iliaca passione, ad intestinorum implicationes diducendas et explicandas, vel
 "materiam iis contentam ante se agendam et promovendam, non sufficiat;
 "summa ratione ad majorem ejus quantitatem, adeoque ad libram, confluendum
 "videtur."

Mr. OLDENBURG produced and read two papers, one of which in Latin was
 sent to him by a member of the society, who would not be named, containing
 some animadversions upon the rules of motion communicated to the society, and
 made public, by Dr. CHRISTOPHER WREN and Monfr. HUYGENS^k, viz. that from
 those rules it followed, there would be an increase and diminution of the sum of
 motion in the world: which the animadverter esteemed to be such a paradox, as
 was not to be admitted, unless it were supported by irrefragable experiments. Dr.
 WREN being present declared, that he had foreseen and considered that conse-
 quence, and esteemed it as a corollary, that naturally followed from his theory,
 and was true, having been verified by experiments made by himself and others,
 and there appearing none to the contrary. This being entertained by the society
 as very rational, it was ordered, that Mr. OLDENBURG should be desired to ac-
 quaint the author of the animadversions with this answer of Dr. WREN, and to
 return him the society's thanks for imparting those ingenious reflexions of his;
 adding, that in case he had made, or should make, any experiments disproving the
 said consequence, the society would be very glad to be informed thereof for farther

^k They were sent to Mr. OLDENBURG in a
 letter from Mr. FRANCIS WILLUGHBY, dated
 May 29, 1669 entered in the Letter-Book, vol.
 iii. p. 83. in which letter he acquainted Mr.
 OLDENBURG, that he might publish these papers
 in the *Philosophical Transactions*, if he thought
 them worth it. "But the author of the ani-
 madversions, added he, desires to have his name

"concealed, his only design being to extort some
 "experiments from the ingenious authors of that
 "theory, which he thinks but reasonable; and
 "that no man ought to think his fame strong
 "enough to impose an improbable thing upon
 "this inquisitive world, without either reasons or
 "experiments."

disquisition.

disquisition. This paper was ordered to be registered¹, together with another of the president, wherein it is proved, that the cases of motion are but three², as follow.

$$\begin{aligned} & \text{" Let } s = Ra \\ & \text{" } r = Sa \\ & \text{" } x = ae = ao. \end{aligned}$$

$$\begin{aligned} & \text{" Then } S \frac{1}{r} x = Re \quad r \frac{1}{s} x = Se \\ & \text{" } S \frac{1}{r} x = Re \quad r \frac{1}{s} x = So. \end{aligned}$$

$$\begin{aligned} & \text{" And } rs \frac{1}{r} x = Re \times R \quad ro \frac{1}{r} x = Se + S \\ & \text{" } rs \frac{1}{r} x = Ro \times R \quad rs \frac{1}{s} x = So + S. \end{aligned}$$

" And their sums whose difference is

$$\text{" When } x \leq S \text{ are } \left\{ \begin{array}{l} 2rs \pm rx \mp sx \\ 2rs \mp rx \pm sx \end{array} \right\} r - s \text{ in } 2x.$$

$$\text{" When } r > x > s \text{ are } \left\{ \begin{array}{l} rx \pm \frac{1}{2} rs \mp sx \\ rx \mp \frac{1}{2} rs \pm sx \end{array} \right\} r - x \text{ in } 2S.$$

$$\text{" When } x \geq r \text{ are } \left\{ \begin{array}{l} rx + Sx \\ rx + Sx \end{array} \right\} o.$$

The other paper in English produced by Mr. OLDENBURG contained some experiments concerning the motion of sap in trees, made in the spring of that year by Mr. FRANCIS WILLUGHBY and Mr. WRAY, both members of the society. It was read, and ordered to be registered³; and Mr. OLDENBURG was desired to request them, that as they had opportunity, they would try some experiments, to find, whether there be any circulation of the juice in vegetables as there is of blood in animals.

Mr. OLDENBURG communicated a Latin letter to him from Signor CASSINI, dated at Paris June 10, 1669, N. S.^o giving notice, that he had prosecuted the ephemerides of the satellites of Jupiter for two years more, and intended to publish them, and to send a copy of them to the society, when printed.

June 17. Dr. WALLIS, by the hands of Mr. OLDENBURG, delivered a dozen of his books, intitled, THOMÆ HOBBS *Quadratura Circuli, Cubatio, Sphaerae, Duplicatio Cubi, consutata*⁴. One of which books was for the society, another for the president, a third to the treasurer, two more to the secretaries; and the other seven were distributed to Mr. BOYLE, Sir ROBERT MORAY, Sir JOHN LOWTHER, Dr. WREN, Mr. HOSKYNs, Mr. COLLINS, and Mr. HOOKE.

¹ Register, vol. iv. p. 73.

² Ibid. p. 76.

³ Ibid. p. 77. It is printed in the Philos.

Transact. vol. iv. n^o 48. p. 963.

⁴ Letter-Book, vol. iii. p. 105.

⁵ Printed at Oxford 1669, in 4to.

Mr. HOOKE excused himself for having prepared no experiments for this meeting. He was ordered to take care, that against the next either his own new instrument for working elliptical glasses, or that of Dr. WREN for grinding hyperbolic ones, might be ready; as also that a couple of long pendulums, to be moved by the force of a pocket-watch, be prepared, to see how long they would go even together.

Mr. OLDENBURG read an account in Latin sent him in a letter from Mr. COLEPRESTE dated at Leyden April 1st, 1669, which account was written by JAMES GEORGE SECMON, M. D. The letter and account were ordered to be entered in the Letter-Book^a. The account was as follows:

“ Quid mihi de fodinis Norwegiæ constiterit paucis dabō.

1. “ Effe illic duorum metallorum fodinas, præcipuè ferrarias et argentarias, pro
“ comperto habeo, longo intervallo regionum à se distantes (argentarias autem se
“ diligenter lustrasse, et de his respondere posse;) casuque primum inventas. Ar-
“ gento puro ignibus subterraneis fuso, et ad latera montis scilicet petræ (quæ
“ longitudine præterpropter milliare est, ad cujus radices operæ, artifices, et præ-
“ feci, quasi urbecula quadam habitant) adhærere deprehensio. Alia signa inve-
“ niendarum fodinarum nulla tum fuisse, aut etiamnum esse, nisi communia illa,
“ à RODOLPHO AGRICOLA, et aliis ostensa, inexpectatam scilicet arborum et
“ plantarum aliarum, locis hujusmodi petrosis, et sterilibus, lætitiâ, &c.

“ 2. Effe autem in summo jugo hujus petræ, utrinque plano, facta orificia so-
“ dinarum plura, primo aditu sat patula, multis antris, interdum denis, in pro-
“ fundum, et longum continuatis, in quæ totidem scalis adhibito lumine descen-
“ ditur: venas autem plerumque ab occidente versus orientem tendere; sæpe
“ etiam interrumpi, unde antrorum illa multitudo.

“ Adhiberi etiam virgam divinam ad inveniendas venas, sed nullo sæpe suc-
“ cessu, fortè (ille inquit) quod corylus debito modo et tempore cæsa non sit.

“ 3. Metallicidas opus in 12. horas in opem continuare, manè et vesperi, aliis
“ egredientibus, aliis in fodinas succedentibus, quorum numerus in universum ad
“ 300 fere accedit. Instrumenta sunt malleus, et cælum, scilicet scalprum ferreum
“ capite plano, pede lato et acuto, quo decusum de petrâ metallum petrosum fu-
“ niculis et furculis sub dium educitur, ubi ab examinandi artificibus deprehensio,
“ * * *, nullâ certâ proportionē, contineri in materia metallica, metalli tota
“ massa urgentibus malleis, scilicet funibus per molas aquatiles motis, contun-
“ ditur, et furnis majoribus, prout sensim sensimque purgatur, argentum exco-
“ quitur.

“ Ingeniosiores fusores argentum vivum adhibent, ut id alterum argentum
“ quasi absorbeat; post separandum.

^a Vol. iii. p. 54. 55.

“ 4. In

" 4. In fodinis ferreis testabatur, plus esse admixtum heterogenii, in utrique
 " unici tantum generis metallum inveniri.

" Etiamfi enim fieri possit, ut diversi metalli, ut æris, auri, aliquantum ad-
 " mixtum inveniantur, tamen id tantillum est, ut separatione indignum esse judi-
 " cant.

" In fodinis autem argenteis etiam metallum purum inventum esse, quod ul-
 " terioris elaborationis non indigeret. Aliquando inventum esse frustum (maxi-
 " mam partem) purum, longitudine trium cubitorum, latitudine, et crassitie sesqui-
 " cubitali, sed id rarum admodum esse.

" Magnetes et ex ferreis, et suis mineris erui.

" 5. Venenatas expirationes aliquando etiam operarios interfecisse, nec se scire
 " (ait) an remedio aliquo, ut cordiali aliquo pharmaco, se præmunire ipsi sciant.

" Aquas, quæ nonnunquam copiosè affluunt, laborem impedire, sed per in-
 " strumenta, in eum usum elaborata, extrahibis.

" Homunculos, scilicet spectra subterranea (more ipsorum metallicorum) nigris
 " linteis vestita, sibi morem gerentes non lachere, sed adjuvare, in se peccantes
 " sæpe perimere &c."

Mr. OLDENBURG produced a printed relation with a cut representing a double matrix, said to have been in a woman lately opened at Paris; in the false one of which two matrixes there had been conceived a foetus, which at last was broken loose, and fallen into the abdomen, and so killed the mother. Some members were of opinion, that it might not be a double matrix, but what is called by anatomists *tuba Fallopii*.

Sir ROBERT MORAY gave occasion to discourse of the present eruption of Mount Ætna, and how the combustible matter under ground, as sulphur and nitre &c. might come to be set on fire. Some members thought, that by the breaking of some stones, and their falling upon collected inflammable matter, fire might be struck, which kindling it, might be the cause of such conflagrations.

Mr. HOSKYNs mentioned an instance of allum-stones in the north of England, which being broken small, catched fire, and burnt all away.

It was thought desirable to write to some curious and intelligent person residing in Sicily, and to desire him to give the society an account of all the remarkable circumstances of the eruption of Ætna.

* Philof. Transact. n°. 48. p. 959.

Mr. OLDENBURG said, that he had already written to Signor ALFONSO BORELLI, professor of natural philosophy at Messina, to that purpose, and hoped to receive a good account from him on that subject.

The operator was ordered to attend the president at the Navy-office, and to receive his lordship's orders how to fit some of the instruments to be sent to sea with the lord HOWARD.

It was moved also, that that instrument might be fitted for the lord HOWARD, which had been formerly contrived by Mr. HOOKE for fetching up from the bottom of the sea what might be there, as stones, shells, plants, &c. which is done by a couple of springs shutting and catching as soon as the instrument touches the ground.

Mr. HOOKE mentioned, that he hoped to be now able to rectify the engine formerly contrived by him for the well grinding of great spherical glass's so as to free it from those defects, which were hitherto discovered therein: which he was encouraged by the society to put in execution.

The president put Mr. HOOKE in mind of making a true meridian for observing the present variation of the needle; and also to make at last the observation, formerly recommended to him, concerning the magnitude of the earth.

June 24. At a meeting of the COUNCIL were present

The President

The lord BRERETON
Sir ROBERT MORAY
Dr. GODDARD

Mr. HENSHAW
Mr. COLWALL
Mr. OLDENBURG.

The president having proposed from the commissioners of the navy, that the society would undertake the weighing up of the wrecks in the Thames at Woolwich; upon debate, it was resolved, that his lordship should be desired to return this answer, that the society being destitute of the necessaries for undertaking such a work, were ready to give their assistance to his Majesty's officers therein, and to depute certain persons of their body to take care of the performance, referring themselves to his Majesty's gratification upon the effecting thereof.

The president reported, that the committee appointed June 10. to consider of the way to carry on the society's business, had agreed upon a letter, once more to be sent about for soliciting the arrears; and that such a letter was drawn up, and ready to be presented to the council: which being read, it was, after some amendments, ordered, that several copies should be made of it, directed first of all to such fellows, as were in and about London, and their delivery to be recommended to those, who had proposed such, as were in arrear to the society. The said letter was in the following terms:

* His letter in Latin was dated May 18, 1669, and entered in the Letter-Book, vol. iii. p. 79.
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" Sir

" Sir,

" By order of the council of the Royal Society I am to give you notice, that you are in arrears of the contribution, which by your subscription you engaged yourself to pay, the sum of ——— : and to offer to your consideration, that the society being not yet endowed with any revenue, is not in a capacity to bear the charges of the proper work thereof, and maintain the necessary officers, without the contribution of the fellows ; so that if the society fail therein, the dishonour of it must light upon all such, as do not pay their contribution. It is therefore hoped upon such considerations (which perhaps might not occur to you before) that you will forthwith take order for your payment of all your arrears, and duly pay the said contribution for the future, as long as you shall think fit to continue a fellow of the society."

The society did not fit this day, on account of the want of a sufficient number '.

July

* Between this and the next meeting Mr. OLDENBURG read the following letter from NATHANIEL FAIRFAX, M. D. which, though not read to the society, yet deserves a place here on account of the remarkable fact contained in it.

Woodbridge [in Suffolk,] June 28, 1669.

Sir,

• • • The entertainment of the present address is to be a relation of self-flattery, which having had the luck to take air beyond and wide of you, I thought in time some story or other thereabouts might haply arrive at you. Wherefore more to gratify your curiosity, than that I judge it very unattractive philosophically, I have taken occasion to pen it, and that brokenly too, as I found it in my loose diary, being as follows :

Mrs. Jane Naunton, a maiden lady, about twenty-three, descended from ancestors of condition near this place, and sojourning under the same roof with myself, very fat of body, but handsome, having appetite and digestion both of solids and liquids beyond what is usual with those of her qualifications, being no farther concerned with religion than as im-aging heroicalness was the measure of it, a devoted affecter of romances, with the life and soul whereof she was practically spirited, as a good Christian is with that of the bible ; of a spirit superlatively high and precipitating, averse to second thoughts, and pertinacious ; otherwise well accomplished and discerning ; in the latter end of March last took a pease, upon a neglect, as she thought, of some concern in the improvement of that, whence she, being an orphan, should derive the accommodations of life. When perceiving her accounts growing beyond what she could answer from her

proper income or other genetal method, she resolved upon stinting her expences by a new found invention of fasting, till death should set her beyond the reach of secular wants. Her principle was this, that it was more commendable for her to die than to do any thing unworthy of her as a gentlewoman ; but to be beholden to kindred for assistance of livelihood, or otherwife betake herself to the artifices of the yeomanry, was such. Now as for laying violent hands on herself, she was against that, because the fruit of an hasty passion or moodiness, which were rudenesses ill becoming such a daughter of reason and courtship, as she must bear herself. But because convenience for a generous way of dieting could not be procured without gratuities from friends, she conceived herself no ways bound to uphold her body by these ignoble supports. Nor must this be self-murder any more than a soldier's exposing his body in the field, when a cowardly flight might save him. As for the thwartings of holy writ, she was not very careful to save them ; for concluding this to be virtuous, she knew, whatever was so, must needs be religious. Upon this foot she stood against all the world, and April 1st, began to take up in diet, only eating a Jam-ball or two at a treat, and drinking short of her wont. Second day she betook herself only to small beer, of which she took sometimes three, sometimes two [glasses] sometimes less ; at which rate she held on for about a fortnight, eating no thing ; forsaking also tobacco (of which she had been a taker) from the first day. During this time she lived under extreme hunger and cravings, and had feury remembrances by gripes and fitches, which not being able to continue to sleep to herself, when with us, she was fain to retire. Yet

Yet

July 1. Mr. OLDENBURG read a written letter to him by M. HUYGENS from Paris

Yet the second week, she said, was better than the first.

About the middle of April she fell again to tobacco, which in two or three days gave her two or three stools, a way of evacuation, which till then had been wanting from the first day: nor did that effect from tobacco last any longer than those three days.

At a fortnight's end, her arms and hands grew deadish, and winterly (which before were fair enough) and so continued; her face wan, except when passion had stirred her.

About three weeks end she had her catamenia in course, when in five or six days time she sucked the juice of six China oranges. Nearer the month's end, to cure the furrings of her tongue, she sucked sparingly certain Seville oranges; her mouth growing scorbucal, and her gums bleeding, for which she used by way of guggle salt and water.

April 30. she sucked part of a limon, and then she abated of her beer drinking, only the third part of her glass-tumbler, holding in all but $\frac{1}{2}$ vi, and many days none at all; only from thence to the 11th or 12th day she had taken down the juice of sixteen limons. Most nights she slept not till four in the morning, between which and ten she had usually three or four broken sleeps. Then her flesh wasted sensibly, the skin shrunk, and scurf peeled off. She was always cold to the touch, and her feet, she told me, colder than her hands; to her own sense; her pulse very low, her urine lixivial, of a deeper asul citrine than that of the scurvy.

The 11th day walking in her bed-chamber, her spirits failed her, and she fell down and hurt her arm; whereupon she gave over walking afterwards. Whereas her bed used to warm her, after she had laid a little while in it, now she remained cold night and day: her head ached, her legs pained her at the bone. In the heat of the day she was best. The sun declining, at four or five she was forced through cold to bed, yet could she not hear a fire in her chamber; it made her faint, she said. For air sake she always kept her casement open by the bed-side. She gave over her fine needle-work, (at which she was ingenious beyond most gentlewomen) a fortnight e'er this; as also reading, because her eyes pained her upon any wished looking.

17th, She rose between twelve and one, and then and thenceforward could only sit up till her bed was made. 18th. she could gain no heat in bed; and was so as never before, wild in her head, so as she could not lie down, her head far'd to confusion. She complained of a cold-

ness in her stomach and pain in her side, disaffected heart, and had her coursis out of course.

19th. Sitting up as before, she complained her head was giddy, and legs trembled; and she told me she believed her palate was more critical than when well.

From 22d to 25th took a little vinegar, and sence any juice of limon: but 26th returned to juice again. 27th and 28th full of fainting fits, 29th and 30th slept often, and was faint at walking, all day long. 30th and 31st drank nothing.

June 1st, 2d, drank nothing, nor 3d till night, having spent the day in frequent faintings, for which she only used refreshing scents. From the 4th to 6th she sweat often, and that might hurt extremely: so held on 7th, 8th, and 9th, abating in her beer, and had several agonies and throws night and day: those broke on her again almost in course. 10th Her throws increased, which she had hitherto borne like a Roman: now they extorted outcries. So she continued much in the condition of a woman in travel at times to 16th. She devoured more oranges, to strengthen, I suppose, but she said because they grew drier. Then either through fear of death, or sense of pain, or both, she was fain to give in, and rising betimes dressed for a walk, which she was confident she could go through, her spirit was so bent upon it. Accordingly, by the help of myself on one side, and her nurse on the other, after seven or eight rests we hauled her a mile out of town, where she took horse, and rode at night to Ipswich. That day she began to feed on buttered peas, which, she told me, made her sick; after that a pint of strawberries (and that day nature befriended her by stool) afterwards fish and bread. Flesh meat she cannot yet bear. Butter is still offensive. Last Wednesday she told me, she thought she should have died, being afflicted all day with head-ach and fainting. Her countenance is palish and wan as much as ever: and she is now taking diet with as much wariness, as she had forsaken it with rashness, being at present as great an instance of a trifling resolver, as she was before of an adventurous eater.

This account I could easily gather, the coming daily to my lodging, which able, and I waiting upon her almost every day in her chamber, when weakness had confined her. Asking her towards the end of her fasting, how her stomach stood to victuals, she answered me, that she neither craved food, nor loathed it. As for corner-bits, I believe she had none. The intance to me is confirming as to that common remark, *Natura paucis contenta*.

June 26, 1669, N. S. *, containing his acknowledgments for the approbation expressed by the president at a meeting of the society, concerning his rules of motion; as also a description of a burning concave of thirty four inches diameter, melting all sorts of metals, and vitrifying brick in less than a minute; together with another proof of his new way of printing, which proof was made by a geometrical figure, and an intimation of a very curious book of Signor PEDI, a Florentine philosopher, touching the generation of insects; and a remark on Mr. Hooke's pendulum applied to a pocket-watch. It was ordered, that he should be desired to acquaint the society, how thick the iron was, that was melted by the burning concave.

Mr. Hooke taking notice of the remark made on his long pendulum moved by a pocket-watch, viz. that the smallness of the vibrations renders the pendulum more sensible of the impression, which the watch makes upon it, said, that the weight appendant to the string was so great, that that impression could have no power upon it.

After this came in the Venetian ambassador, Signor Mocenigo, to be present at the experiments appointed for this meeting, which were these,

1. The magnetical watch of Mr. Hooke, going slower or faster according to the greater or less distance of the load-stone, and so moving regularly in any posture.
2. Mr. BOYLE's way of weighing water in water; of which he was desired to give in the description to be registered.
3. His new method of exhausting the air out of water in a glass cane, whereupon the water being shaken, it fell against the end of the cane with a noise like that of a stone or metal.
4. Burning coals in a box dissolved by air, as a menstruum, in the opinion of Mr. Hooke.
5. A microscopical observation of moss-seeds.
6. A representation of the manner, how the planets may move from a natural cause in an ellipsis by Mr. Hooke, who was ordered to prosecute the experiment.

He was ordered likewise, to prepare against the next meeting the long pendulum with great weights formerly appointed, to try how long they would go even together; as also one of the two new engines for grinding elliptical and hyperbolic glasses.

July 8. Mr. BLOME presented a petition to the society about encouraging and

* Letter Book, vol. iii. p. 109.

licensing his English work of geography; which petition being read, it was ordered, that Dr. GODDARD, Mr. COLWALL, and Mr. HOOKE should be desired to consider of that petition and of the book itself, and to report to the society their opinion upon the whole what they thought proper to be done in that affair.

The experiment of representing the manner of the elliptic motion of the planets was again made, and ordered to be farther prosecuted at the next meeting.

Dr. TIMOTHY CLARKE communicated a letter to him in Latin of June 29, 1669, from Dr. JOHNSTON concerning the young fasting woman in Derbyshire, named MARTHA TAYLOR, together with his apprehension of some imposture in the affair; which made him desire, that by the authority of his Majesty she might be searched by some intelligent physician, assisted by a justice of the peace. The letter being read, Dr. CLARKE was thanked for his communication, and desired to permit a copy of the letter to be taken for the society's Letter-book; which he readily allowed. It was as follows^a:

“Ornatissime Domine,

Junii 29, 69.

“Ne igitur diu humanitatem vestram detineam, quæ de longa inedia puellæ
 “Derbienis observavi, quæ possum brevitate, perstringam, ejusque historiam
 “duplici tabula delineabo: *Hæc*, ut ex proprio accepi ore, quam ideo exaro, ut
 “si alius variam narravit fabulam, facilius ejus fraus appareat: *Illi*, ex propriis
 “observationibus. Prioris ut contraham velum, MARTHA TAYLOR, 19 annorum,
 “filia cunicularii, metallis damnata, dum 11 ætatis agebat annum, ex ictu circa
 “regionem renum, per 14 dies febricitabat, cum paralyti inferiorum membrorum.
 “Tum inopinanter è lecto surgit, cæque per 10 dies scholæ abecedariæ relegarè,
 “iterum increbuit febris et paralytis per 14 alios dies, et per decem convaleuit.
 “Tum melancholiâ obscurata religiosâ (recurrente paralyti) tandem deliravit,
 “maniâ per sex menses leviore correptâ. Interim singultus tam immanis, ut per
 “400 vel 500 passus audiretur. Quoties à cruciatu singultus liberata, scripturæ
 “sacræ, aut librorum religiosorum lectione noctu et interdiu se exercebat.
 “Circa festum omnium sanctorum 1665, menstrualis erupit fluxus, cum urina
 “nonnunquam cruenta; et circa festum sancti MICHAELIS Archangeli 1667, ob-
 “serato isto profluvio, tum præter singultum (qui adhuc permanet) violento vo-
 “mitu omnia conquassata interanea, et circa festum sancti ANDRÆ, sanguinem
 “egerebat è ventriculo, hæmorrhagiâ etiam per nares, oculi sinistri canthum, et
 “aurem lævam molestata, ut ex hoc sanguinis dispendio adeò debilis fuerit, ut
 “vix audiri potuerit ab adstantibus. Die sancti THOMÆ Apostoli 1667, tres
 “taleolas pomi artocreas cocti deglutivit, et abhinc nullam solidam escam hausit.
 “Atque ad secundum Februarii sequentis vix labia irrigabat, et ad pascha sequens
 “syropo ex aqua fontana et saccharo cum pauxillo mellis rosacei fauces permaduit,
 “aphthis tum exulceratas; et per sex septimanas in æstate ne guttulam sumpsit
 “liquoris, sed odore florum resocillata vitam degit angelicam. Circa festum om-
 “nium sanctorum 1668, iterum syropo è saccharo, et aqua fontana, fauces, vel

^a Letter-Book, vol. iii. p. 113.

“linguam

linguam potius, imbuat. Circa natalitium Domini 1668, succum unius pruni Damasceni (pulpa et cute ejecta) aut passulæ majoris fuxit; et initio Februarii mucagine sacchari Thomaci ex apice cultelli, semel in die deglutiebat, nihil enim antehac à primo jejunio in gulam intrasse sentiebat. Et secundo iduum Aprilis vinum claretum saccharo conditum ad uncias duas in tota septimana sumpsit; sed totum ejus madorem faucibus absumptum sentit, quia una vice vix sex guttas primoribus labiis gustat. Per totum hoc tempus nec urinam aut alvi tractulices excrevit, nec (ut illa dicit) sudavit. Ungues nec manibus aut pedibus hoc temporis curriculo creverunt: Sed capilli capitis paulò sunt extensiores. Hæc omnia mihi retulit, antequam quaestionibus filium orationis præcedi. Interim observavi, quòd facies erat vegeta, oculi vividi, labia succulenta, ut etiam genæ: plorabat semel, strophiole bis vel ter, inter confabulandum, nares et os obturebat. Sapius lingua ad palatum alissa sonum edebat infantis deglutientis basia uberis.

Loquelam bis vel ter singultus inopinus, insoliti soni, et, ut mihi videbatur, simulati, interturbavit, et difficilis respiratio nonnunquam determinavit, nec tamen, ut aiebat, spiritus fatiscebant. Erecta lecto discumbit, et cucullo faciem obumbrat; per duas horas (nisi bis vel ter interpolante singultu, aut dyspnœa) mihi et adstantibus liberè, et vivaciter confabulavit, contrectabam in primis manum, quæ parum in vola sudavit, internodiis digitorum, et aliis locis scabie defædatis, alias mollis et firma. Pulsus erat omnibus numeris sanorum similissimus. Abdomen à cartilagine ense-formi ad pubem depressum; sed non, ut Citesius refert de puella Confolentanea, cui abdomen adeò emarcuit et tabuit, ut ab imis costis ad pubem usque nihil pristini superfuerit aqualiculi, sed sola à sterni pendula mucronata cartilago, non aliter quàm saggundia, quæ extra perpendiculum stillicidia ejiciunt.

Retulit mihi, quòd intestina delapsa erant, et vesica de loco deturbata. Tum dixi, illam à spectatoribus falli, quia vesica absque uteri ulcere egredi nequit. Rogavi igitur, quænam esset moles tumoris circa anum; respondit ad magnitudinem nucis juglandis: Tum, inquam, nec intestina delapsa erant per anum; at illa inquit, altero loco i. e. per rimam pudendi prodeunt: peto igitur, ut oculis essem testis, et manu explorarem quinam esset ille tumor. Postquam igitur sub stragulis eam observassem diu locum præparare; inguen manibus stipavi, et n.e. inficere invitavit; sed tam obscura lux et apertura tam angusta, ut nec colorem nec figuram agnoscerem, nec contrectare possem, quia etsi minime tangebam, de dolore acerrimo conquirebatur; et vulvæ labia, sursùm elevata, quantum judicare potui, solummodò palpabam.

Aveo igitur, ut remota lodice, liberum intuitum permetteret; illa contrà, satis perspicue vides. Iterum igitur levissima vi manus ejus amovere conabar; illa vero magis intensè de dolore querebatur; super abdomen igitur (interjecta lodice) manum apposui, et sudantem inveni, etsi prius negavit ullum madorem de aliqua parte corporis manare: unde illum dolere, aut in metu esse sentiebam. Tum petii, quomodo tumorem mundum, et à putrefactione præservabat? Respondet, per fomentationem cum aqua, lacte, aut ejus cremore, aut ferro, aut ce-

revisia,

“ revisita, et inde refocillationem sentire, et, ut mater mihi postea retulit, illam
 “ inde nutrire.

“ Hoc modo frustra contra puellæ placitum aut astutiam colluctans, expeto, ut
 “ in os inspicerem: tum mater (quæ hætenus in hortulo fuit, relicta filiâ natu
 “ minori in cubiculo) obganniens reclamation, dicens, filiam ejus minimè esse hypo-
 “ critam, dum toti regioni, immo Angliæ, abunde satisfecisset, et afflictam ejus
 “ puellam, in honorem Dei miracula ejus denunciantem, multiloquio vires abusu-
 “ mere sæpius sentiebat. Nolui igitur illam ulterius molestare; filia tamen libenter
 “ annuit ut inspicerem, et nil præterquam quod in sanis assolet observavi, nisi
 “ quod lingua fuit parum aridior. Intra conchas aurium nullum apparuit cereu-
 “ ma, sed collum modice torosum, scabiæ interspersum vidi, et jubam satis den-
 “ sam. Tum è tuguriolo matrem seduxi, et datâ pecuniâ efflagito ut suaderet
 “ filia, precidentiam illam vaginæ uteri mihi ostendere. Ohi (inquit callida mu-
 “ lier) nondum scio qualis sit ille tumor; filia enim mea probe scit, quàm miserè
 “ affligar ex ipsius calamitate; idè nec illa ostendit, nec ego cupio illum videre;
 “ et D. Dr. WILLUGHBY Derbienfis adeò illius commiserabatur, ut videns illum
 “ insolitum tumorem penè in lypothymiam incideret. Unde mihi videtur, quòd
 “ vir ille doctissimus, cui opposunitas erat exploiandi, persunctoriè inspexit.
 “ Tum nec hac methodo instructior, contuli me iterum ad puellam, et dixi, ne
 “ nolle eam amplius inquietare; omnibus tamen perpensis sperare, opem illi con-
 “ ferre, saltem à putrefactione excretum illud, quodcunque fuerit, præservare, et
 “ per clysmata nutrimentum subministrare, donec ventriculi obstructio esset referata.
 “ Hæc enim dixi, ut tentarem, utrum curationem exoptaret, et ut alio tempore
 “ votis meis annueret. Postquam ab illa egrediebar, audivi, quòd femina quæ-
 “ dam, mille tum passibus remota, sæpius somentaverat locum; ad hanc igitur
 “ equitavi, et illa dixit, se sæpius trimetris spatio fovisse aquâ, lacte, &c. et cum
 “ primo illum inspexit, fuisse instar carnis excoriatae, sed jam cuticulam habere,
 “ tumorèque nonnunquam anferis ovum æquare, nonnunquam esse ampliorem, et
 “ è cavitare uteri prodire.

“ Habes, vir clarissime, prolixam satis historiam; et facile suspicaris, quòd an-
 “ sam præbeo dubitandi, utrum sine omni cibo et potu tam diu vixerit; an verò
 “ minori ferculorum varietate contenta, et liquida etiam, remotis arbitris, foibil-
 “ lans, et fortasse in vesicam aliquam appendicem alvum exonerans, aut saltem urin-
 “ nam, spectatores etiam ingeniosos hætenus delukrit. Ne igitur, ut de dente
 “ Silestii aureo, ficta et fallax esset hypothesis, necessariū judico, ut virtuosus ex-
 “ quisito scrutinio dirimant controversiam, dum inter mortales degit puella; post
 “ mortem enim ejus (nisi anatomicum subit cultellum) aucta erit controversia, et
 “ nulla indagine determinanda. Aucta esse privilegia societatis literatorum Aug-
 “ gustæ nuper exauldavi. Aequum est, ut vobis conferret Regia Majestas faculta-
 “ tem designandi idoneos viros auctoritate firma munitos, qui acrius et experi-
 “ mentis, in rebus dubie fidei et anomalis, veritatem investigarent. Et in hoc
 “ casu, ubi non solum pichi, sed etiam viri sagaces fluctuant, et alii, qui sacris scie-
 “ dedere, ob miraculi speciem obfirmati sunt in suis opinionibus, necessarium
 “ videtur, ut rei certitudo cognoscatur. Ut omnis igitur dubitandi ansa præci-
 “ piatur, supplex exoro, necumque plurimi alii, ut à serenissima Regia Majes-
 “ tate

"tate jussum obtineat dominatio vestra, ut aliquis medicus (accitis justiciariis vicinis, vel fide dignis testibus) oculari inspectione partes affectas exploraret: Sed hæc acerrimo vestro judicio, ut totum hoc inconcinnum scriptum, subijcio."

Mr. BOYLE presented for the repository a certain African gum, the name of which he knew not, reported to be very sticking and binding, and sold at a considerable rate.

Mr. OLDENBURG read a letter to him from Mr. WILLUGHBY, dated June 21, 1669, at Middleton in Warwickshire⁷, concerning the circulation of sap in trees, and his thoughts of the experiments making out the rules of motion given by Dr. WREN and Monfr. HUYGENS. With regard to the circulation of sap he observed, that he had always been of opinion, that the sap circulates; though it would be very difficult certainly to evince it by experiments; but that perhaps the anatomy of some of those animals, which lie torpid all the winter, and yet feed and grow no more than vegetables, may give some light into that subject. With regard to the laws of motion he wrote thus: "My lord BROUNCKER hath very briefly and accurately demonstrated the same consequences from Dr. WREN's theory. I think it cannot be expected, that any one should produce contrary experiments, till those are made public, by which the learned authors support their hypothesis; though I think it were not hard to confirm or weaken it by trying the different effects of the same force communicated immediately and mediately by greater and lesser bodies. What HUYGENS hints, that the sum of the Q of the velocities multiplied into their bodies is the same before and after the concurrence, seems to fall out very luckily; for it being plain, that $Q_s - x R + Q R + x Q R + x^2 = Q_s + x^2 R + Q R - x^2$. From thence may deduced, that motion cannot be decreased or increased infinitely, but that bounds may be set both for the increase and decrease of all the motion in the world."

It was ordered, that Mr. OLDENBURG should send to Mr. WILLUGHBY a copy of the paper containing a series of experiments formerly made by Mr. LAURENCE ROOKE and Dr. WREN; and press him to make observations for finding out, whether the sap in trees circulates, or not.

Mr. HOOKE acquainted the society, that looking over some of the things in their repository, he had met with such a hand as Monfr. LE FEBURE once produced before the society, mentioning, that it was given him for the hand of a mermaid; but that this hand was a part of a sea-leopard, and altogether like that of Monfr. LE FEBURE.

Dr. ALLEN related a story of a man lately bitten by a dog, and thence fallen into an hydrophobia, of which he died. The doctor was desired to give the relation in writing, which he promised to do.

⁷ Letter Book, vol. iii. p. 108.

It was mentioned, that some years before, there being two live rattle-snakes brought into England, and kept in the college of physicians, they lived a considerable time without any food, yet at length decayed by little and little, and then died: It was added, that at first their bitings suddenly killed puppies, cats, &c. but at last lost that power.

Mr. OLDENBURG produced and read a paper containing some observations on the Bath-springs, sent him by Mr. Glanville: Which was ordered to be registered*.

Mr. Hooke proposed an experiment about the strength of twisted cords, compared with untwisted ones, to be tried at the next meeting, together with those others, that should have been made at this meeting.

July 15. There was present at this meeting Count HERCULES DE ZANIS of Bologna, one of the philosophical academicians of that city, who upon occasion declared, that the way of preparing the Bononian stone for shining was not lost, but that himself knew it, and was ready to send for some of it calcined in his manner from Paris, for the society. He added, that the stone was very common about Bologna, and a good quantity of it found in his estate near that city. He conceived, that as talc, found likewise plentifully there in the fissures of mountainous and mineral places, was generated by the rain-waters dropping through the earth down into those fissures, and in their sliding away congealed by the extraordinary cold of those parts in such a manner, that the droppings successively following and spreading themselves there made thin plates on the top of one another; so this Bononian-stone was formed by the same rain-waters, impregnated with certain mineral juices, and successively congealed by the cold.

Mr. Hooke made an experiment of comparing together the strength of twisted and untwisted silk, and it appeared by the several trials made of it, that a certain number of threads untwisted proved stronger than so many twisted. Whence Mr. Hooke concluded, that cables made faggot-wise would be stronger than when twisted.

To this it was objected, that cables would not then be so managable; and that certainly people had not been wanting to make trials of this nature, but had doubtless found, that, all things compared, the inconvenience would prove greater in the use of untwisted than twisted threads.

Mr. Hooke remarked upon this, that the belief of the superior strength of twisted threads to that of untwisted had doubtless proceeded from trials made upon flax, which having but short pieces held not therefore so well untwisted as twisted.

Sir ROBERT MORAY moved, that an equal number of hempen threads, first

* It does not appear in the Register, but is printed in the Philos. Transact. vol. iv. n^o 49. p. 977, for July 1669.

spun, should be taken, and only whipt about, and as many of them twisted together in the ordinary way, to see, which of them would be the stronger.

There was produced the instrument of taking an angle between two objects, so as to see one of them immediately by the eye, the other by reflection: As was likewise

Mr. TOWNLEY's instrument for dividing a degree into many thousand parts.

Mr. OLDENBURG exhibited a scheme of the marsh-plots of Xaintonge in France, where the French salt is made, together with a description of the process of making it, sent to him from Dr. ELIAS RICHARD, a French physician living near the place, who having been not long before in England, and permitted to be present at a meeting of the society, communicated this scheme and discourse as an acknowledgment of the favour, which he had then received. The reading of this discourse was deferred to the next meeting^a.

Mr. HOOKE promised to have ready at that meeting one of his new kind of watches, that should go fourteen months, which he first produced and described May 6, 1669.

The members appointed at the last meeting to consider of Mr. BLOME's petition made this report, that the society would not give an approbation of any book, but what should appear to them to be very accurate; and that it was not likely, that any member of their body had the leisure to read over so large a work as Mr. BLOME's; and farther, that if a bare license were only desired, that could not be granted by them without some perusal of the whole, to see, that no gross faults were contained in it.

This report was judged satisfactory, and the secretary was directed to acquaint Mr. BLOME with it.

Mr. HOOKE intimated, that he was observing in Gresham-college the parallax of the earth's orb, and hoped to give a good account of it.

July 22. Dr. TIMOTHY CLARE communicated a letter written to the president by WILLIAM DURSTON, M. D. from Plymouth July 18, 1669, containing an account of a maid's breasts excessively swelled in one night^b. It was ordered, that the writer of this letter should be desired by Dr. CLARKE and the secretary to communicate what farther observations he should make about the state of this woman's health, and the continuance of that tumour, together with the applications used for the abatement of it.

Mr. OLDENBURG read two letters, the one written to him by Mr. GLANVILL

^a There is no notice in the Journal of its being then read, but it is printed in the *Philos. Transf.* vol. iv. n° 51, p. 1025, for September 1669.

^b Letter-Book, vol. iii. p. 149: And *Philos. Transf.* vol. iv. n° 52, p. 1047, for Oct. 1669.

from Bath July 19, 1669⁵, the other to Mr. GLANVILL by Mr. ANDREW PASCHALL from Chedsey in Somersetshire June 18, 1669⁶, both giving an account of a design of establishing a philosophical correspondence in that country under the directions and encouragement of the Royal Society; who declared by their president, that they could not but with all kindness accept this respect, and should endeavour to countenance the undertaking upon all occasions.

The society being made acquainted by Mr. OLDENBURG, that Mr. EDWARD DIGGS intended to go shortly to Virginia, and offered his service for philosophical purposes; it was ordered, that the inquiries formerly drawn up for that country should be recommended to him.

It was resolved, that in regard many of the members of the society were in the country at this season of the year, the meetings thereof should be intermitted till the president should find, that there was a competent number of them in town again, who should then be summoned by his lordship's order to return to the meetings.

It was ordered, that Mr. HOOKE should, during this interval, make such experiments in private, as were in the former meetings committed to his care and left hitherto unperformed. As also, that such others of the society, who had convenience to make any observations and experiments of a philosophical nature, should be desired to be mindful of doing what they could during this recess of the society against the resuming of their meetings.

October 11. At a meeting of the COUNCIL of the SOCIETY were present

The President

Sir GILBERT TALBOT
Sir ROBERT MORAY
Sir PAUL NEILE
Sir THEODORE DE VAUX

Dr. CLARKE
Dr. GODDARD
Mr. COLWALL
Mr. OLDENBURG.

It was ordered,

That the treasurer pay THOMAS WILLISEL ten pounds more, as a part of the thirty pounds appointed him by the council for one year upon account:

That Mr. CHARLES HOWARD, Dr. GODDARD, Dr. MERRET, and Mr. HOOKE, or any two or more of them, meet and direct the said THOMAS WILLISEL in his employment of farther collecting such plants, birds, fishes, and minerals, and in such parts of his Majesty's kingdoms, as they shall think best for the use of the society; and that the said THOMAS WILLISEL, at his return, first of all attend the president, and receive orders from him about the collection, which he shall then have made:

⁵ Letter-Book, vol. iii. p. 152.

⁶ Ibid.

That the president, Sir ROBERT MORAY, Sir THEODORE DE VAUX, Dr. CLARKE, and Mr. OLDENBURG, or any three or more of them, be a committee of the council for auditing the accounts of the treasurer of the society; and that they agree among themselves about the time and place of their meeting for that purpose. And

That Dr. MERRET be desired to send the collection made by THOMAS WILLISEL in his first voyage, to the society at their next meeting in Arundel-house Octob. 21, 1669.

The president declared, that he thought proper, that the meetings of the society should now be resumed, and that therefore he intended to summon the members to meet on the 21st instant; for which he gave this form:

“ These are to give notice, that the Royal Society is to meet again on Thursday the 21st of this present month of October, in Arundel-house, at the usual hour, and thenceforth to continue as formerly.”

October 21. This day the SOCIETY met again after some intermission.

Mr. HOOKE produced a piece of stuff stained by a way of his own contrivance, which he said he hoped to perfect, and to make it serve for staining whole suits of hangings. He was desired to pursue this experiment.

EDWARD JEFFREYS, M.A. was proposed candidate by the lord bishop of CHESTER.

Mr. OLDENBURG produced several letters and other papers with some curiosities, come to his hands since the last meeting of the society.

1. A Latin letter of Signor MALPIGHI to the society dated at Bologna July 15, 1669^a, acknowledging their favour in electing him into their body, and in causing his discourse on the silk-worm to be printed.

2. Another from him to Mr. OLDENBURG of the same date^b, signifying his care of increasing the philosophical correspondence in Italy, and adding some farther observations made by himself on the silkworm.

3. A letter in Latin from JOHN ALFONSO BORELLI to Mr. OLDENBURG, dated at Messina July 24, 1669^c, promising an account of the burning of Ætna.

4. Two letters to Mr. OLDENBURG from M. HUYGENS, dated Aug. 10^d, and Sept. 4^e, 1669, N. S. at Paris; the former of which commended Dr. WREN's demonstration of the hyperbolical cycloid, and acknowledged the doctor's way of compendious printing to be the same with his own; adding some notable experiments of

^a Letter-Book, vol. iii. p. 135.

^b Ibid. p. 134.

^c Ibid. p. 157.

^d Ibid. p. 164.

^e Ibid. p. 173.

a large burning concave made in France; together with his opinion of Mr. WILLIAM NEILE's hypothesis of motion, whose reasoning he thought very metaphysical and subtle, but whose principles he could not for the most part assent to. The other letter deposited with the Society a paper containing the anagrams of fourteen propositions of Monfr. HUYGENS, to be explained in due time¹, with some account of the success of his sea-watches.

5. A letter in Latin to Mr. OLDENBURG from Monfr. SLUSIUS, dated at Leige, August 16, 1669, N. S.² commending Dr. WREN's invention and demonstration of the hyperbolic cycloid, and enlarging upon it: and taking notice of the paralogism of Mr. HOBBS in his quadrature of the circle, which piece had been shewn to Monfr. SLUSIUS four or five years before by Monfr. DE SORBIERE, and confuted by Monfr. SLUSIUS.

6. A Manuscript in Portuguese delivered to Mr. OLDENBURG by Sir ROBERT SOUTHWELL, intitled, *Varias Receitas et Segredos da Medicina*; which was recommended to Mr. OLDENBURG to procure a translation of it into Latin or English.

7. Two pretty large glass-bottles, sent with the manuscript by Sir ROBERT SOUTHWELL; which bottles were filled with capiva-balsam from Brasil, described by PISO as excellent for the curing of wounds and ulcers; part of which was ordered to be distributed to such of the members, as should desire to make trial with it.

8. A box containing several particulars gathered in the late eruption of mount Ætna, sent by Mr. PARKER and Mr. MORGAN, English merchants at Messina, to Mr. EDWARD HOPEGOOD, merchant of London, for the Royal Society; viz. small bags of ashes, taken up in divers places, some on the top of, and others at several distances from that mountain.

A bag with some sal armoniac.

A bag with sandever.

Several sorts of stones called *sciarri*, some like cinders and black, others reddish, others close and dense.

A map representing the fire and its extent.

9. A little glass sent to Mr. OLDENBURG from Dr. DE GRAAFF, containing a *testiculus gliris*³ unravell'd and swimming in spirit of wine, designed to prove, that that organ is made up of nothing but small vessels.

Dr. KING remarked, that he had formerly done the same, not only in the *testes*

¹ Register, vol. iv. p. 81.

² Ibid. p. 167.

³ Dr. DE GRAAFF sent with it a letter to Mr.

OLDENBURG dated July 25, 1669, a passage of which is printed in the Philos. Transact. vol. iv. n° 52. p. 1046. for Octob. 1669.

of male rabbits, but also in those of a man, spreading those vessels upon a broad glass, and so presenting them before the society. He was desired to dissolve a testis after this manner of Dr. DE GRAAFF, and to exhibit it in spirit of wine, this way of making the thing more clear, which he promised to do, when he should have leisure.

10. An answer of Dr. WILLIAM JACKSON, a physician of Nantwich in Cheshire, to certain queries concerning the salt-springs and salt-works of that place: which was ordered to be registered *.

THOMAS WILLISEL the botanic traveller, employed by the society, brought in his collection of plants gathered in several parts of England and Scotland, together with some rare Scottish birds and fishes.

It was ordered, that Dr. MERRET be thanked for digesting these plants, and that Mr. HOOKE take the whole collection into his custody for the repository, making first of all an inventory of them, and producing them before the society.

The lord bishop of CHESTER acquainted the society, that his Majesty had expressed a desire of having the measure of a degree upon the earth determined, and expected the assistance of the society in it:

Upon which it was ordered, that the bishops of SALISBURY and CHESTER, Sir ROBERT MORAY, Sir PAUL NEILE, Dr. WALLIS, Dr. CHRISTOPHER WREN, Dr. GODDARD, and Mr. HOOKE, or any three or more of them, be a committee to consider of a way of determining the measure of a degree upon the earth; and that they meet for that purpose at the president's house in Covent-Garden on the Monday following about five in the evening, and make a report to the society, when they shall have concluded any thing in this matter.

Mr. HOOKE was likewise desired to peruse what RICCIOLI had written and performed on this subject, and to give an account thereof to the said committee at their first meeting.

Oct. 28. Mr. JEFFREYS was elected.

Mr. HOOKE produced a new kind of pendulum-clock, designed to keep time more exactly than others, for astronomical observations, and so contrived, that the swing being in this clock fourteen feet long, and having a weight of three pounds hanging to it, was moved by a very small force, as that of a pocket-watch, the swing making its whole vibration not above a degree, and going seventy weeks.

It being objected, that any concussion was likely to disorder or stop it, Mr.

* Register, vol. iv. p. 83. It is printed in the Philos. Transact. n° 52. p. 1060. for Novemb. 1669.

HOOKE declared his opinion, that it would not. He was ordered to try it in astronomical observations, and give the society an account of its success.

He shewed again a piece of stained flannel, as being thought the most difficult stuff to be stained; and he again expressed his hopes of staining whole pieces of hangings after this manner, even in vivid colours.

Mr. OLDENBURG read a letter to him from Dr. THOMAS BROWN, dated at Norwich, Octob. 25, 1669*, inclosing a relation of his son Dr. EDWARD BROWN, then travelling in Germany, concerning the quicksilver mines in Friuli^o; which was found to agree with that brought in formerly by Dr. POPE^p.

Mr. OLDENBURG informed the society, that he had received a letter himself from Monfr. JUSTEL, dated at Paris October 25, 1669, N. S. signifying, that in Italy an obscure belt had been seen about the middle of the body of Saturn; as also that P. GOTTIGNIES had made a microscope magnifying above three hundred and fifty times in diameter, and taking in a field of four palms, which is about three feet; and that the microscopes of the workmanship of EUSTACHIO DIVINI came not near in goodness to this of GOTTIGNIES.

Mr. HOOKE affirmed, that such a belt had been observed in England by Mr. BALLE about three years ago; and that he had a letter of that gentleman mentioning it.

It being observed, that it had been ordered above three months before, that Dr. WREN's engine for grinding hyperbolical glasses, and that of Mr. HOOKE for elliptical ones, should be prepared for making trials of them; and it being found, that neither of them were prepared; the order was renewed to Mr. HOOKE for doing it with all convenient speed.

Mr. OLDENBURG mentioned, that Dr. WREN desired to borrow the model of that engine of his, in order to make a scheme and description thereof for the satisfaction of Monfr. HUYGENS, who, though he had much applauded that invention, and the demonstration of it, yet had made some objection against its practicableness; which objection seemed only grounded on the objector's misapprehending the contrivance of the engine; to remove which Dr. WREN was willing to send him a scheme of the model.

It being mentioned, that Dr. GODDARD had been formerly desired to give in writing his experiment about the manner of the motion of the muscles, whether they in their contraction grow bigger upon the whole or not; and this not being yet done, the doctor was again desired to do it, that it might be entered in the Register-Book.

* Letter-Book, vol. iii. p. 189.
vol. iv. n^o 54. p. 1080. for Dec. 1669.

† Ibid. p. 199. It is printed in the Philos. Transact.
^p Printed in the Philos. Transact. n^o 2. p. 21.

The order of the last meeting, appointing a committee for considering of a way to determine the quantity of a degree upon the earth, being renewed, and those members, who might since have had thoughts of it, being desired to speak of it, Mr. Hooke declared his opinion, that one of the exactest ways of performing it might be by making accurate observations of the heavens to a second by a perpendicular tube, and then to take exact distances of angles to a second also ¹.

Nov. 4. Mr. JEFFREYS was admitted.

Mr. Hooke proposed a way of dividing a degree in very many minute parts, which he conceived to be much more easy than that by a screw or a sliding ruler, or any other known to him. It consisted in proportioning a short line, which is to be divided into many small parts, to a long line.

This being examined, and the application of it to practice for taking measures both in the heavens and upon the earth debated, it was thought proper to be used in the experiment of measuring a degree upon the earth, recommended by his Majesty to the consideration of the society: and Mr. Hooke was ordered to make the apparatus necessary for that work ready with all possible speed.

Mr. OLDENBURG read part of a letter written to him by Monfr. HUYGENS from Paris, October 30, 1669, N. S. ² giving notice, that he had received an account of his sea-watches sent to Candia for a trial to find the longitude, and would hereafter declare the particulars, which he judged worthy to be known; and communicating some remarks about motion: and as he complained, that the metal, of which he had made two telescopical object-glasses for the length of forty-five feet each, was faulty; the society ordered, that a plate of good glass, made at Lambeth, should be provided and presented to him.

Mr. OLDENBURG produced a paper in Latin, sent to Mr. HILL from Riga by NICHOLAS WITTE, an ingenious doctor of physic, concerning a way of ordering wines so as to preserve them from the injuries of frost.

November 11. THOMAS BARRINGTON, esq; was proposed candidate by Mr. OLDENBURG.

DON GASPAR MERE DE SOUZA, professor of mathematics in the university of Coimbra, was likewise proposed by Mr. OLDENBURG upon the desire of the former expressed in two letters of his dated at Lisbon June 2, and July 1, 1669.

Dr. URBANUS HIERNE, a Swede, was proposed candidate by Monfr. LEYONBERGH, the Swedish resident.

¹ This appears to have been the method observed by the French not long after. See Monfr. PICART's treatise on that subject, and Monfr. DU

HAMEL's *Regiæ Scientiarum Academia Histor.* l. i. c. 2. p. 98.

² Letter-Book, vol. iii. p. 194.

There was presented from Mr. BOYLE the second edition of his *Physiological essays* enlarged, and with the addition of *A discourse of absolute rest in bodies*.

There was also presented for the repository from Mr. POVEY a skeleton.

The president nominated Dr. WALLIS, Mr. LOCKE, Mr. NEILE, Dr. SMITH, and Mr. CREED, to be a committee to examine the accounts of the society for this year; who being put to the ballot, according to statute, were all elected; and thereupon desired to meet the next day about three in the afternoon at Dr. WALLIS's lodgings in little Drury-Lane, to examine the said accounts, which they promised to do.

Mr. HOOKE produced a piece of callico stained after the way contrived by himself, which he was desired to prosecute in other colours besides those, that appeared in this piece.

He produced likewise several capillary plants, supposed to have no seed, on which however he found little cases or boxes, which being opened and put into a good microscope were found to have seed.

Dr. CROUNE mentioned, that Mr. MOHUN, a friend of his, was ready to go into the East-Indies to the English factory at Muslapatan, and offered his service to the society for giving them what account he should be able, in answer to such inquiries, as they should think fit to recommend to him. The secretary was accordingly desired to provide for Mr. MOHUN a copy of such queries, as were usually sent into those parts.

Mr. OLDENBURG produced a letter written from Erfurd, May 10, 1669, to Mr. BOYLE by Dr. LEICHNER, a German physician, and accompanied with a book of his, printed in High Dutch, and intitled *D. Eccardi LEICHNERI apodictischer Prufe-Spiegel*, i. e. *Speculum apodictico-probatorium*, tending to introduce in schools and universities a way of teaching all disciplines and sciences apodictically or demonstratively, even logic, metaphysics, natural philosophy, ethics, &c. for the promoting of which method he recommended this book to the consideration of the Royal Society; who committed it to the perusal of Mr. OLDENBURG.

Nov. 18. Mr. BARRINGTON, DON GASPAR DE MERE DE SOUZA, and Dr. URBANUS HIERNE were elected; the second of whom being in Portugal, Mr. OLDENBURG was desired to acquaint him of his election by a letter¹.

Monfr. GEORGE STIERNHelm, a Swedish gentleman, and one of the council of war to the king of Sweden, was proposed candidate upon his desire expressed in a letter from Stockholm to the president dated September 21, 1669², and delivered at this meeting by Mr. CHAMBERLAYNE, who presented at the same time

¹ This letter written in Latin, and dated Decemb. 8, 1669, is inserted in the Letter-Book, vol. iii. p. 209.

² Ibid. p. 184.

from Monfr. STIERNHJELM several curiosities, as 1. An instrument called by the presenter *linea Carolina*, together with a written paper explaining the design and use of that line, viz. that, supposing common water to be alike all over the world, and taking a Batavian grain for the least common measure, it would teach to know all other measures both of liquids and dry things, and from thence to know also the capacities of all vessels, and the change of their shapes in any other shapes whatsoever assigned. 2. A printed table of the measures of liquids and dry things, and for surveying. 3. A printed scheme, called *monile MINERVÆ*, the design of which did not appear to the members present. 4. A printed half sheet, intitled *GEORGII STIERNHJELMI Babel destruita, seu Rerum Suetivica*, being a breviary of two volumes designed by the author for the press, undertaking first to shew the true origin of languages, which he makes to be the Scythian tongue; and then to discover the roots, that are universal and common to almost all languages, out of which he attempts to derive the first tongues, and thence the others, which proceed from them. 5. Four little boxes, each containing two little balls, one silvered, the other gilded over, devised for estimating the weight of liquors. 6. Tables of quadrate and cubic numbers, printed at Stockholm in 1667.

The president was desired to consider the full import of the *linea Carolina*, together with the written paper, and the printed table, both relating to it, and to make report of it to the society at their next meeting.

Mr. HOOKE produced an instrument of his own contrivance to measure the quantity of refractions; and the experiments made therein were ordered to be repeated at the next meeting.

Mr. OLDENBURG read two letters written to him, the one from Dr. DURSTON, dated at Plymouth, November 2, 1669¹, concerning the death of the big-breasted woman, and what was observed of her swelled breasts after death: the other by Dr. ELIAS RICHARD from St. Martin in France, dated Aug. 17, 1669, containing a relation of the French way of making vinegar.

With regard to the former of these letters, it was thought desirable to know of Dr. DURSTON what he had observed in the inward parts of the woman, he doubtless having opened her after her death². And concerning the other letter of Dr. RICHARD, several inquiries were suggested, as proper to be sent to him for farther explanation, as 1. Whether the *rape* (as the matter, of which vinegar is made in France, is called) is not permitted to lie till it begin to grow sour, and then put in? 2. How long one and the same parcel of *rape* will serve, whether longer than one year? 3. How they free the *rape* from that grease or unctuousity, which it is said to contract? 4. Whether it had not been examined what kind of grease that is, which is said to stick partly to the sides of the vessels, and partly to the *rape*?

¹ Letter-Book, p. 201. It is printed in the Philof. Transact. n^o vol. iv. 53 p. 1668. for Nov. 1669.

² He was not suffered to open her, as appears

from his letter of Nov. 28, 1669. Letter-Book, vol. iii. p. 205. and Philof. Transact. n^o 54. p. 1077.

Dr.

Dr. CASTLE produced a piece of wood, which, he said, was petrified by being put, not into a petrifying water, but earth in Bedfordshire, in which it had lain three years. Being tried upon glass, it made scratches in it, though it had the perfect appearance of wood.

The doctor was desired to procure a perfect history of it from the person, who had kept it buried in the ground.

Mr. HOOKE promised for the next meeting some experiments of weighing bodies, to shew the porosity of them, and a way of making them more compact than they were before by hammering them.

Nov. 25. Mr. BARRINGTON was admitted, and for his admission paid five pounds, the sum required being but forty shillings.

Mr. NICHOLAS MERCATOR was also admitted.

Mr. HOOKE brought in the instrument for taking angles upon the earth in order to measure a degree exactly, contrived so, that in the use of it no notice is taken of any inequality of the ground; the wire employed therein being always equally extended by an equal weight.

Sir ROBERT MORAY produced a paper sent out of Poland to the lord ARLINGTON, concerning a method of restoring with a certain water such eyes, out of which the humors have been squeezed; which had been successfully tried in Cracow.

Several of the members were of opinion, that if nothing be squeezed out but the humors, the coats remaining safe, there was no great wonder in such a cure. In the mean time it was moved by the bishop of CHESTER to cut the cornea of a dog, to see whether it would heal again.

Mr. OLDENBURG gave an account of the substance of a French book lately printed at Paris in 8vo, and intitled *Nouvelles Experiences sur la Vipere par Monsr. CHARAS*; viz. 1. That the author undertakes to prove, that the biting of the vipers of France is really venomous, and proves mortal without antidotes. 2. That he endeavours to confute Signor REDI, who had asserted in his book *delle Vipere*, published a few years before, that the poison of vipers resides in the yellow liquor contained in the bag about the teeth, Monsr. CHARAS maintaining it to be in the veins and enraged spirits of the animal. 3. That he very much recommends the volatile salt of vipers, as the best antidote against their bitings, and teaches the way of preparing it right.

The bishop of CHESTER took notice hereupon, that the society had formerly made several trials of this kind, to find, whether the bitings of vipers would kill; but found, that they did not, and only made the part, that was bitten, to swell without any other hurt; and that he thought vipers killed no more than bees,

when they stung; and that sometimes their bitings might prove mortal, when they meet with an ill habit of body.

Mr. OLDENBURG produced again the balls for knowing the difference of the weights of liquors, presented at the last meeting by Mr. CHAMBERLAYNE from Monfr. STIERNHELM; and two of them being opened, the silvered one proved to be ordinary bees wax; the other gilt to be soft red wax, with some mixture, the former swimming, the latter sinking in common water.

Nov. 29. At a meeting of the COUNCIL were present

The President

The lord bishop of SALISBURY
The lord bishop of CHESTER
Sir PAUL NEILE
Sir THEODORE DE VAUX
Dr. GODDARD

Mr. COLWALL
Mr. HENSHAW
Dr. CROUNE
Mr. OLDENBURG.

The committee of the council for auditing the accounts made a report, which was approved of by the council, and is as follows:

" At a committee of the council of the Royal Society for auditing the treasurer's accounts, November 10, 1668.

" Upon examination of Mr. DANIEL COLWALL's accounts we find him debtor

	l.	s.	d.
" To arrears due to the Royal Society for their quarterly payments, this 10th Nov. 1669. ——— ———	1283	4	6

" To money he hath received for admissions ———	18	0	0
--	----	---	---

" To money he received out of the cash-chest ———	100	0	0
--	-----	---	---

" To the balance of his last account ———	98	5	6
	<u>1499</u>	<u>10</u>	<u>0</u>

" That he is creditor

" By money he hath paid for the use of the society ———	400	2	4
--	-----	---	---

" By money in arrear resting unpaid by the fellows ———	1028	15	0
--	------	----	---

" By balance resting in cash now in his hands ———	70	12	8
	<u>1499</u>	<u>10</u>	<u>0</u>

" BOUNCKER, P. R. S.
TIM. CLARKE.

" THEODORE DE VAUX.

" HENRY OLDENBURG.

November

November 30. At a meeting of the SOCIETY, being the day of their anniversary election,

Mr. WILLIAM NEILE made a report from the committee for auditing the accounts of the society, by which it appeared,

	<i>l.</i>	<i>s.</i>	<i>d.</i>
That the treasurer had received on the quarterly payments	254	9	6
That he had received out of the cash-chest	100	0	0
That he had received more for admissions	18	0	0
That he was debtor to the balance of his last account made up } Nov. 9, 1668.	98	5	6
	<u>470</u>	<u>15</u>	<u>0</u>
That he hath paid for the use of the society by bills and orders } of the council	400	2	4
That he hath in money resting now in cash in his hands seventy } pounds twelve shillings and eight pence	70	12	8
	<u>470</u>	<u>15</u>	<u>0</u>

It appearing, by this report, that there were great arrears due to the society by the fellows, Sir PAUL NEILE declared his opinion, that to prevent the swelling of those arrears, a good method would be to enter into a legal tie for the future payments; adding, that this had been several times under the consideration of the council, but that they had referred it to this day, on purpose first to acquaint the society, and to understand their sense upon it, before they would conclude any thing in it.

This being debated, it was at last agreed upon, that the business should be put to the question, viz. 1. Whether a legal tie should be entered into for the discharge of the weekly payments. And, 2. if so, whether the council should be desired to draw up a form for such a legal tie, and present it to the society?

The president accordingly put these two questions, which were both carried in the affirmative. And it was farther agreed upon, that this offer should be made by the council on the first Thursday of the next term.

This being done, the society proceeded to the chief work of this day, and, according to their charter and statutes, elected a new council and officers.

Those continued of the COUNCIL were

The

The lord viscount Brouncker
 The lord Henry Howard of
 Norfolk
 The lord bishop of Salisbury
 The lord bishop of Chester
 The lord Breton

Sir Robert Moray
 Sir Paul Neile
 Dr. Goddard
 Mr. Colwall
 Mr. Henshaw
 Mr. Oldenburg.

The new members of the Council were

The earl of Aylesbury
 Mr. Charles Howard
 Sir Robert Southwell
 Dr. Christopher Wren
 Mr. Locke

Dr. Smith
 Mr. Hoskyns
 Dr. Balle
 Mr. Creed
 Dr. King.

The officers chosen were

The lord viscount Brouncker, president.

Mr. Colwall, treasurer.

Mr. Henshaw, } secretaries.
 Mr. Oldenburg, }

Of the new members of the Council were sworn Mr. Howard, Sir Robert Southwell, Dr. Smith, Mr. Hoskyns, and Dr. Balle; the rest being absent.

Between this and the preceding election died two eminent men, who were members of the society, Sir John Denham, knt. of the bath, and George Batz, M. D.

Sir JOHN DENHAM was only son of Sir JOHN DENHAM, knt. lord chief baron of the exchequer in Ireland, and one of the lords-justices of that kingdom, by ELEANOR his wife, one of the daughters of Sir GEORGE MORE, bart. baron of Mellifont in Ireland. He was born in the city of Dublin about the year 1613, but brought from thence very young, upon his father's promotion to the post of one of the barons of the exchequer in England in 1617, and after he had been qualified at school in grammar learning, was sent to Trinity-college in Cambridge, where he was admitted a fellow-commoner in Michaelmas-term, 1631. During his residence there he discovered none of those talents of genius and wit, which afterwards distinguished him, his love of cards and dice diverting him from any application to his studies. After he had continued about three years in Trinity-college, and been examined in the public schools for the degree of bachelor of arts, he removed to Lincoln's-Inn, where though he seemed very assiduous in the study of the law, he still indulged himself to excess in his favourite amusement of gaming, till his father being informed of it, threatened to disinherit him, unless he corrected that vice*. This made such an impression upon him, that he composed a little *Essay*

* Wood, Athen. Oxon. vol. ii. col. 422.

against Gaming, exposing the ill consequences of it; which he presented to his father as a proof of his reformation: but after the death of his father^r, which happened January 6, 1638, he relapsed into his former course, in which he soon lost a considerable part of the fortune, which had been left him. His tragedy, intitled *The Sople*, acted at the private house in Black-Friars by his Majesty's servants, and published in the latter end of 1641, raised him at once a considerable character as a writer; and occasioned Mr. WALLER to say of him, that he broke out like the Irish rebellion, threecore thousand strong, when no body was aware, or in the least expected it. Not long after this he was appointed high-sheriff of the county of Surrey, and made governor of Farnham-castle for the King: but not being well skilled in military affairs, he kept that post but a short time, retiring to his Majesty at Oxford^s, where in 1643 he printed in 4to his poem called *Cæsar's Hill*, reprinted with additions at London in 1650 and 1657 in the same form. He suffered imprisonment for some time on account of his zeal for his royal master^t; and after his release from it went to Paris. Upon the King's being seized by cornet JOYCE, and brought to the army, in the beginning of June 1647. Mr. DENHAM undertook to the Queen, that he would find some means to get access to his Majesty; which accordingly he obtained by the interest of HUGH PETERS^u, a preacher and a powerful person in the army; and coming well instructed from the Queen, the King, who had been long kept in the dark, discoursed very freely with him of the whole state of his affairs; and at his departure from Hampton-Court in Novemb. 1647, commanded him to stay privately at London, in order to send to him and receive from him all his letters from and to all his correspondents at home and abroad, being furnished with nine several cyphers for that purpose. This trust he discharged with great safety to the persons, with whom the King and himself corresponded, till about nine months after being discovered by Mr. COWLEY's hand, which was known, he escaped happily both for himself and his correspondents^v, and went abroad^w, attending upon the prince of WALES in Holland and France, from whom, after the death of CHARLES I. and before the young King's departure from St. Germain to Jersey, he had a grant of the reversion of the office of surveyor-general of his Majesty's buildings, after the decease of INIGO JONES, who died July 21, 1651. He was sent by his Majesty together with Mr. WILLIAM (afterwards lord) CROFTS, envoy to the King of Poland^x, where they collected among the Scots 10000 l. for the use of CHARLES II.^y About the year 1652 he returned to England, and being reduced to low circumstances by his former excesses in play and the sale of his estate by order of parliament in July of the preceding year, he was entertained by PHILIP earl of Pembroke at Wilton, and in London

^r He was buried at Fgham in Surry.

^s Wood, col. 423.

^t Memoirs of Sir JOHN EBERLEY, p. 4. edit. London 1702.

^u Ibid. and Sir JOHN DENHAM's dedication of his poems to King CHARLES II. 2d edit. 1671.

^v Dedication to King CHARLES II.

^w Mr. Wood, col. 423. shews, that Mr. DENHAM, in 1648, conveyed away the duke of York from the palace of St. James in Westminster, then under the tuition of ALGERNON earl of Nor-

thumberland, and carried him into France: but this must be a mistake, since the duke himself in his own *Memoirs* cited by Mr. CARLE in his *General History of England*, vol. iv. p. 578, 579, makes no mention of Mr. DENHAM as being concerned in his escape, which appears to have been entirely managed by col. JOSEPH BAMPFIELD.

^x Wood, ubi supra.

^y DENHAM's Poems, p. 67.

for above a year. At the Restoration he entered upon his office of surveyor general, and on occasion of the coronation of the King in April 1661, was created knight of the Bath. He laboured for some time under a disorder of his understanding, imputed to the discontent arising from his second marriage; but recovering from it wrote the year before his own death an excellent poem on that of his friend Mr. COWLEY. He died at his office near Whitehall, in March 1665, and was interred on the 23d of that month in the fourth cross isle of Westminster near the graves of CHAUCER and COWLEY.

GEORGE BATE, M. D. was son of Mr. JOHN BATE of Bourton in Buckinghamshire, and was born at Maids-Morton near Buckingham about the year 1608¹. After his first education in grammar learning at school, he was sent to the university of Oxford, and became one of the clerks of New-college in the beginning of 1622, at the age of fourteen. From that college he was removed to Queen's, and thence to Edmund-hall², as a member of which he took the degree of Bachelor of Arts. 28 April 1626³, that of Master 22 January 1627⁴, and that of Bachelor of Physic March 1628⁵. Being then licensed to practise physic, he exercised his profession in and near Oxford for some years, chiefly among the Puritan party, whose principles he was thought to espouse⁶. Upon taking the degree of Doctor of Physic, 7 July 1637¹, he grew more eminent in his profession; and when King CHARLES I. kept his court at Oxford, after the breaking out of the war between him and the parliament, Dr. BATE was appointed chief physician to his Majesty. But upon the decline of the Royal Cause he retired to London, where he became physician to the Charter-house, and fellow of the College of Physicians². Though, upon his settling in London, he is affirmed by Mr. WOOD³, to have complied with the times for interest's sake; yet he published, but without his name, in 1648 in 4^{to}, a piece in favour of King CHARLES I. under the title of *The Royal Apology; or the Declaration of the Commons in Parliament* 11 Feb. 1647 *carried*⁴; and soon after his Majesty's death, a book intitled *Elenchus motuum nuperrorum in Angliâ, simul ac Juris Regii ac Parlamentarii brevis Narratio*, printed at Paris in 1649, and at Francfort in 1650, in 4^{to}. He joined Dr. FRANCIS GLISON and Dr. ANASUERUS REGEMORTER, fellows of the College of Physicians, in compiling that celebrated treatise *de Rabitide, sive morbo puerili, qui vulgo the Rickets dicitur*, printed at London in 1650 in 8^{vo}. His favour with OLIVER CROMWELL, to whom, when both general and protector, he was chief physician, did not prevent him from being admitted into the same post by King CHARLES II. at the Restoration, to whom he dedicated a new edition of his *Elenchus*, as he did the second part of it, printed at London in 1661 in 8^{vo}, to the earl of Clarendon, lord chancellor. But some passages in this work giving offence to the Roman Catholics and cavaliers,

¹ WOOD Athen. Oxon. vol. ii. col. 424. says, that he was 14 years of age in 1622.

² *Ibid.*

³ *Ibid.* Athen. Oxon. vol. i. col. 233.

⁴ *Ibid.* col. 241.

⁵ *Ibid.* col. 247.

⁶ *Ibid.* Athen. Oxon. *ubi supra*.

¹ *Ibid.* Athen. Oxon. vol. i. col. 273.

² *Ibid.* Athen. Oxon. vol. ii. col. 424.

³ *Ibid.*

⁴ He mentions this in his dedication to King CHARLES II. of his *Elenchus*.

⁵ WOOD, col. 426, and Dr. CHARLES GOODALL's College of Physicians vindicated, and the true state of physic in this nation faithfully represented, in answer to a scandalous pamphlet, intitled *The Corner Stone*, &c. p. 145, edit. Lond. 1676, in 8^{vo}.

ROBERT

ROBERT PUGH, a papist, who had been officer in the Royal army during the wars, published remarks upon it, in a piece intitled *Elenchus Elenchi*, printed at Paris 1664 in 8°. DR. BATE intended a third part of his *Elenchus*°, if he had not been prevented by death, having been several years before seized with an apoplexy, which left him for some time in a paralytical condition°. He was one of the earliest members of the Royal Society, being elected into it 12 December 1660. He died at his house in Hatton-Garden in Holborn 19 April 1669, and was interred in the church of Kingston upon Thames, where a monument was erected to him. Several years after his death was published *Pharmacopœia Bateana: in qua cœlingenta circiter pharmaca, pleraque omnia à Praxi* GEORGII BATE REGI CAROLO II. *protomedici excerpta*, printed at London 1688 in 8°, by the care of JOHN SHIPTON, an apothecary of London.

December 2. DR. URBANUS HIERNE was elected.

MR. HOOKE produced a picture printed after the expeditious manner of DR. WREN, who having covered a very thin brass-plate with etching varnish, caused it to be etched upon by a hand careful not to close any letter, in which work the aqua fortis must be so strong, as to corrode the plate quite through: Which done, the plate is to be turned and laid upon another thick plate covered all over with printer's ink, to be passed, after the usual manner, through the rolling-press.

MR. HOOKE was desired to prosecute and perfect this invention of DR. WREN.

He brought in the instrument, formerly promised by him, for dividing a degree into as many small parts, as may be desired, not by a screw or a sliding ruler, but by proportioning a short line to a long one, in order to measure the distances of the stars, and the diameters of the planets. This instrument was to be applied to a twelve foot telescope, and represent a degree in two inches, and magnify thirty times, observing even to seconds; and to be employed in the experiment of measuring the quantity of a degree upon the earth, by measuring therewith, how far a star passeth from the Zenith; which is to done by making two observations, the one northward, the other southward, and taking notice, by the advantage of this contrivance, of the distance, and thence concluding the quantity of a degree, or part of a degree.

SIR ROBERT MORAY produced a Latin paper sent from Paris by one ROBERT DESCARTES, containing several inventions, as, 1. Of finding the parallax by a better way than the author thought to have been invented hitherto, in order to find the physical truth of the Copernican system. 2. Of a perpetual motion by means of the Cartesian *materia striata*, by which magnetic needles are converted to the poles, &c. 3. Framing ships after a new manner, to go under water without danger of ship-wreck. 4. Of an horizontal wind mill. 5. Of a new fashioned musical instrument, excelling a theorbo, harp, bass-viol, &c. 6. Of a pocket pendulum-watch; which appeared to be the same with that of MR. HOOKE.

° See his preface to the second part.

° Ibid.

Sir ROBERT MORAY having perused this paper declared his opinion, that the several contrivances, contained in it, were either already better done here, or were not likely to perform what they pretended to.

Mr. OLDENBURG produced a printed paper, containing some propositions for the carrying on a philosophical correspondence begun in the county of Somerset, and expressing great respect to the Royal Society, and a readiness to serve them with what intelligence the persons concerned in that correspondence should procure in the country towards promoting the society's design.

Mr. OLDENBURG remarked, that this was the effect of what had been laid before the society at their meeting of July 22, 1669, in two letters, one from Mr. GLANVILL, the other from Mr. PASCHALL.

Mr. COLLINS took hence occasion to desire, that since these gentlemen offered their service to the society by way of communicating what should occur in their country, of a philosophical nature, they might be written to, and desired to inquire at Col. OVERTON's, living at Badast near Aller in Somersetshire, after the papers of Mr. SAMUEL FOSTER, who had been Professor of Astronomy in Gresham-college^{*}, which he understood to be in the hands of the said Colonel; and particularly after the paper, which contained Mr. FOSTER's way of dialing by two threads placed at a distance from each, the intersection of their shadows being to shew the time of the day; and that if they could obtain it, they would make a transcript thereof, and send it to the society. Mr. OLDENBURG promised to acquaint Mr. GLANVILL, the secretary of the said philosophical correspondence, with this request.

Mr. COLLINS mentioned, that he had been informed, that many papers of the famous mathematician Mr. THOMAS HARRIOT were in the hands of the son of the earl of Cherbury[†]. Upon which Mr. OLDENBURG said, that he would endeavour to procure a sight and transcript of them, if they were in those hands.

Mr. HENSHAW, at the rising of the society desired the favour of the loan of a manuscript of IRENÆUS in the Arundelian library, for a friend of his to compare it with another manuscript of the same author out of the Oxonian library; adding, that he would be caution for the returning it after a little while to the society. This request was granted, and Mr. HOOKE was ordered to take the caution from Mr. HENSHAW at the delivery of the manuscripts.

The experiments appointed for the next meeting were, 1. The improvement of the new way of printing pictures. 2. The improvement of the new way of staining stuffs. 3. The repetition of the experiments of refraction, formerly began to be made in a new instrument for that purpose.

^{*} He had been elected a second time to that professorship May 26, 1641, and died in July 1652. Dr. WARD's Lives of the Professors of Gresham-college, p. 85.

[†] A mistake probably for RICHARD lord VAUGHAN and earl of CARRERY; or for the lord HERBERT of CHERRYBURY.

December 9. Monf. GEORGE STIERNHJELME was elected, and his election ordered to be signified to him in a letter from the secretary *.

MR. OLDENBURG read an account sent him by Mr. GLANVILL from Mr. PASCHALL, of a labouring man in Somersetsshire, who discharged all his excrements, that are otherwise voided by the anus, through a hole in the left side of the belly, caused there by the twisting of the guts, which not being cured by the swallowing of two bullets and other remedies, and the excrements making their way to the said part of the belly, caused there a putrefaction; upon which followed a hole, letting them out, at which also one of the bullets, after it had been about two years in the belly, was taken out by the patient himself, incrufted for the greatest part with a stony matter shot into crystals; the other part remaining smooth, this being supposed to have been caused by the patient's frequent touching it by a quill, which he often used, to remove it from the hole, in order to open a passage for the excrements pressing there. The bullet being sent with the narrative was also produced and shewn to the society, who desired, that the secretary would endeavour to procure it for their repository.

MR. HOOKE produced another specimen of staining with yellow, red, green, blue and purple colours; which he said would endure washing with warm water and soap.

DR. TIMOTHY CLARKE mentioned, that a person at Deptford had shewed him a specimen of staining upon Indian satten done here, which would endure scouring. He was desired to procure a sight of it for the society, which he promised to endeavour to do.

MR. HOOKE being called upon for the experiments appointed for this meeting, excused himself for not bringing them in, he having had some avocations of a public nature, which had hindered him from preparing those experiments; which he was ordered to do against the next meeting.

Decemb. 16. MR. HOOKE exhibited another specimen of Dr. WREN's new and compendious way of printing; in which pictures likewise might be done.

There was presented from Mr. EVELYN the second edition of his *Sylva* and *Pomona*, with considerable enlargements.

DR. GODDARD's account was read of an experiment formerly made by him before the society, to shew, whether the muscles of an animal, in their motion, are bigger or less in their total sum of dimensions? This account was ordered to be registered †, as follows:

* MR. OLDENBURG's letter in Latin for that purpose, dated December 9, 1669, is entered in the Letter-Book, vol. iii. p. 211.

† Register, vol. iv. p. 95.

“ A case was made of latın capacious and convenient to receive immersed in water the arm of a man, so as the large orifice or entrance into it might be stopped close by the part of the arm next the shoulder, with a small glafs pipe cemented to it towards the other end, opening into the cavity, (according to the figure.) Upon putting in of water first a little warmed, and afterwards of the arm, so as it closed the wide orifice of it, and the water did rise into the small glafs canal; first it was visible, that the water rose upon every pulsation of the artery, and subsided upon every intermission; and then the person being ordered to make a contraction or clutching of his fist of both arms, that within the case and that without at the same time; upon every such contraction, the water in the glafs canal did descend much more, than upon the intermissions of the pulse beforementioned.”

Upon reading this paper, it was suggested by Mr. Hooke, that it would be worth considering what it is, that by its influx makes the muscles act by contraction; and then how the muscles are again relaxed by nature's discharging that liquor or spirit, which contracted them. To illustrate this, he mentioned, that spirit of wine (for example) poured upon gut-strings contracts and shortens them, and being thence evaporated relaxes and lengthens them again. So that, he said, there must be a very subtil volatile spirit, that enters into the muscles; and the same must very quickly be discharged again to cause the contraction and expansion of the muscles.

He intimated likewise, that if he could communicate the force of gun-powder to a spring, he might then command as much strength as he would.

Occasion being here given to speak of well-rectified spirit of wine, Mr. Hooke said, that it might be yet more refined after that all would burn away, it being possible, that though it will burn away, yet there might still be some phlegm in it, which may be carried up with the volatile spirit. He added, that the best proof of its perfect rectification was, if it would fire gun-powder.

Mr. WYLDE mentioned a method of painting farcenets with water-colours, and varnishing them; but added, that the varnish would rot them.

Sir ROBERT MORAY acquainted the society, that before they sat down, one Mr. SMITH of Reading had discoursed to him of a new way, which he had of cloth-making as to all the parts belonging thereto; viz. that he had a peculiar and very easy way of taking out the natural curl of the wool, making it lie as plain as flax: That he could make the hair thrice as fine and long as before, and yet stronger withal: That he could spin three yards for two: That in the weaving he could do that with the third stroke, which otherwise is not done but with nine strokes: That he could so contrive the fulling-mills, as not to make any holes in the cloth: And that he had a method of pressing, so that the cloth should become both longer and finer than ordinary, and yet lose nothing of its strength, nor receive the impression of the wrong side upon the right.

Mr.

Mr. Hooke was ordered to discourse farther with this Mr. Smith of all the particulars, and set down in writing the method used by him in executing what he affirmed: As also to get a specimen of what he said had been already performed in his new way; and to offer him his assistance in the contrivance of divers tools, which he should want.

Particular notice being taken of what Mr. Smith had affirmed, that he could make a hair as fine as silk, Mr. Hooke remarked, that if this could be done, he could tell how to give them all the glossy colours, that should be desired.

The society resolved to adjourn till the 13th of January following, by reason of the approaching festival of Christmas.

In the mean time Mr. Hooke was desired to make the experiment of measuring a degree upon the earth; and to get his new clock, designed to go fourteen months, finished; and to prosecute his method of staining, and the new manner of printing.

December 20. At a meeting of the COUNCIL were present

The President

The earl of AYLESBURY
The lord bishop of CHESTER
Mr. CHARLES HOWARD
Sir ROBERT MORAY
Sir PAUL NEILE

Dr. BALLE
Dr. SMITH
Dr. KING
Mr. CREED
Mr. OLDENBURG.

The earl of AYLESBURY, Dr. KING, and Mr. CREED were sworn of the council.

The business of the legal tie for the discharge of the weekly payments being debated, the putting it to the question was deferred till the next council, the bishop of CHESTER and Sir ROBERT MORAY desiring first to consider and to confer farther of it in private.

The matter of Chelsea-college being again spoken of, Mr. CHARLES HOWARD was desired to think of a fit tenant for that place, and to propose such an one to the council at their next meeting.

Dr. BALLE and Mr. Hooke were desired to finish the catalogue of the society's library within the approaching holy-days.

Mr. OLDENBURG desired the council from Mr. HENSHAW, to lend him for a few weeks out of the society's library a manuscript of IRENÆUS for a friend of his, upon security.

It was ordered hereupon in general,

That

That all those, who shall have granted to them by the council the loan of any of the books belonging to the Arundelian library, bestowed on the Royal Society by HENRY lord HOWARD of Norfolk, shall oblige themselves by a bond of one hundred pounds sterling, to be given to the president, council, and fellows of the society, to restore the same within the time to be respectively prefixed, intire, undetached, and unblotted.

Upon these terms it was ordered, that the manuscript of IRENÆUS should be delivered to Mr. HENSHAW.

1672, January 13. At a meeting of the SOCIETY,

Mr. HOOKE brought in two specimens of staining better than those produced by him before.

He intimated, that an acquaintance of his lately gone to Malabar had promised him to endeavour to get the art of staining used by that people, which that person had said to be performed by them chiefly with a root.

He added, that the preparing of the cloth or stuff to be stained was a main thing in this work, to hinder the colours from spreading too far, and from running all along the thread.

Sir ROBERT MORAY mentioned divers materials of colouring used in Scotland for red, blue, and yellow. He was desired to inform himself by letter of the particulars, and to communicate them to the society; which he promised to do.

It was remarked, that there was not found one simple, which by itself alone would colour green.

Dr. CROUNE produced a piece of rotten wood, broken out of the midst of a rotten willow tree, cut down; which piece had several cavities in it, running out at length, in which lay several substances, shaped like a cartridge, wound about with greenish leaves, and exactly closed at both ends, wherein lodged worms.

Mr. OLDENBURG was desired to write an account of this to Mr. WILLUGHBY, and to inquire of him, whether he had observed the like; and if so, into what flies such worms changed.

Mr. HOOKE mentioned, that he had been informed of two springs in Northamptonshire, neither of which single would petrify, but meeting together they did so. He was desired to learn more particulars of it.

Mr. COLLINS produced the solution of the problem promised by him, of measuring distant objects at one station.

* Mr. OLDENBURG's letter to Mr. WILLUGHBY on this subject dated January 20, 1672, is inserted in the Letter-Book, vo. iii. p. 226.

The

The amanuensis was ordered to draw the schemes of it larger, that all the members might see them at the next meeting, when the papers should be read.

Dr. POPE remarked, that Mr. TOWNLEY had a like way of measuring distances; and that not long before he had measured the height of an hill in Lancashire, where he resided.

Mr. OLDENBURG produced a manuscript sent and addressed to the president by Mr. JOHN FLAMSTEAD of Derby, giving an account of some of the more notable celestial phenomena of the year 1670, to be conspicuous in the English horizon; among which was an eclipse of the sun visible in England April 9, but omitted by all other astronomers; as also several occultations of some fixed stars by the moon.

Some particulars of it being read, the society declared, that this was a very useful labour for the improvements of astronomy; and that therefore the author should receive their thanks by the secretary*, and be made acquainted not only with their acceptance of his respect to them, but also with the value, which they had for his design and labours, and that he should be desired to continue this his industry: that the main things in these papers should be published in the next *Philosophical Transactions*†, whereby to communicate them timely to such as might observe: as also that the original be kept among the society's papers.

Mr. HENSHAW returned the manuscript formerly lent him out of the society's library, viz. *Psalterium interlineatum antiquo Normannico*.

There were presented from Dr. WALLIS two books published by him, one intitled, *Mechanica, sive de motu translatus geometricus*; pars prima: London 1670 in 4to; the other intitled, THOMÆ HOBBS *Quadratura Circuli secundò edita demò re-sutata*: printed at Oxford in 1669.

Jan. 20. Mr. HOOKE produced for examination two ways of making an universal measure‡, one by purged quicksilver, dropt on a plain exactly horizontal, and having a dry surface, until the horizontal diameter of it be double to the perpendicular of the same; which being obtained by exactly comparing the said two lines together, the longer of them shall serve for the measure, e. g. for an inch.

The other way was by dropping distilled water from the point of a very fine needle, and counting so many drops for a measure of such a denomination.

Many exceptions were made by divers of the members against both these ways: to the former, that even distilled mercury would be different; and that the air of several places would alter the dimensions; and that it was very difficult to measure

* Mr. OLDENBURG's letter to Mr. FLAMSTEAD dated Jan. 14, 1668, is in the Letter-Book, vol. iii. p. 255.

† They were accordingly published, vol. iv. p. 55. p. 1099 for Jan. 1670.

‡ See his Posthumous works, p. 472.

exactly

exactly the horizontal and perpendicular diameters. To the latter, that it is very difficult to have every where needles equally pointed, as the same size of drops.

For these and the like difficulties both these ways were laid aside.

Mr. COLLINS's solution of the problem for measuring the distances of three objects from one station was read, approved of, as to its truth (though its practicableness at sea was doubted) and ordered to be registered^c.

Mr. OLDENBURG produced and read a letter written to him by Monfr. HUYGENS from Paris January 22, 1670, N. S.^d containing an account of the success of his pendulum-watch sent by sea to Candia, and of his thoughts concerning Dr. WREN's engine for grinding hyperbolic glasses, Mr. BARROW's lectures on optics, and Mr. BOYLE's discourse on the *absolute rest of bodies*; as also about the judgment given by the Royal Academy of Sciences at Paris concerning the invention of a man, who pretended to discover the longitude from the moon's motion, but appeared to know less of the subject, than others, who had made the same pretences before him.

Mr. OLDENBURG produced another letter written to him by Monfr. SLUSIUS from Liege, Jan. 2, 1670, N. S.^e concerning Dr. WREN's hyperbolic cylindroid, and an hydrostatical experiment; the reading of which letter was deferred till the next meeting; as also of a paper, containing CASSINI's new way (by him so esteemed) geometrical and direct, to find the apogees, excentricities, and anomalies of the motion of the planets.

Mr. HOOKE having declared his opinion, that Dr. WREN's engine for grinding hyperbolic glasses would not be practicable, as he did not see how rings could be avoided in that way; but that he conceived, that his own engine, formerly produced before the society for working glasses, both of an elliptical and hyperbolic figure, might be reduced to useful practice, he was exhorted by the society to cause such an engine to be made with all possible speed; to which he answered, that one was making.

Jan. 27. Mr. SMETHWICK produced a stony substance altogether like an egg in shape and colour, pretended to have been found in a sandy field near Newark. Upon a strict view several of the members judged it to be artificial, and nothing else but a piece of white marble turned oval. It being proposed, that it might be cut asunder, to see it within, Mr. SMETHWICK alledged, that he had no permission for it, but would try, whether he could obtain it.

Sir ROBERT MORAY remarked, that the King had heard of a piece of ground in Northamptonshire, wherein wood and other things buried would be petrified.

^c Register, vol. iv. p. 95. It is printed in the Philof. Transact. vol. vi. n^o 69. p. 2093.

^d Letter-Book, vol. iii. p. 228.

^e Ibid. p. 213.

Mr. OLDENBURG read the paper concerning CASSINI's pretended new method, geometrical and direct, of finding the apogees and eccentricities of the motion of the planets: after which he moved, that it might be inquired into, whether the like method had not been already found out in England. Whereupon Mr. MERCATOR, having considered this matter in private, produced a paper of his, which shewed, that this very thing was founded upon what Dr. SETH WARD, now lord bishop of SALISBURY, had demonstrated in his *Astronomia geometrica* published in 1656. This paper was read, and being found to be the demonstration of this alleged invention of CASSINI, printed as such in the French *Journal des Sçavans* of September 2, 1669, it was thought proper, that the narrative of the truth of this matter should be published in the Philosophical Transactions¹, together with the ground, which Mr. MERCATOR affirmed to have been given long before by HERIGON² in his *Theoria Planetarum*; not omitting to make mention of the occasion, that was given to the bishop of SALISBURY for finding out that demonstration, viz. by Monsr. BULLIALDUS, who had acknowledged, that this was wanting in astronomy.

Mr. OLDENBURG produced a printed map of the royal channel in Languedoc, at that time making for the conjunction of the ocean and the mediterranean, in length about thirty leagues, each consisting of four thousand fathoms; in breadth sixty feet, and in depth nine feet; entering at one end into the Garonne a little above Tholouze, and so into the ocean, and at the other end into the lake of Frontignan, and so into the mediterranean; and furnished with a supply of waters from divers springs, and many small rivers, and especially by five rivers issuing out of the *Montagne noire* not very far off; which, as they naturally run from North to South, are made by a new channel to change their course, and to run East and West, to serve for the purpose of this great work³.

Feb. 3. Mr. HOOKE produced a contrivance of his to try, whether a mechanical muscle could be made by art, performing without labour the same office, which a natural muscle doth in animals. It was so contrived, as that by the application of heat to a body filled with air for dilatation, and by the application of cold to the same body for contraction, there might follow a muscular motion. It was objected, that it did not appear, how this agent, that was to produce heat and cold, could be applied for use, so as to cause this motion immediately, and with that speed, as it is done in animals. However Mr. HOOKE was ordered to consider more fully of it, and to acquaint the society with the result of his farther considerations.

He suggested, that if it could be done leisurely this way, the motion might be rendered quick by springs.

Mr. OLDENBURG produced and read several letters written to him from divers parts: one from St. Martin near Rochelle, Jan. 14, 1670, N. S. by Monsr. Ri-

¹ It is printed there, vol. v. n^o 57. p. 1168. for March 1670.

maires at Paris

² See Philos. Transact. vol. iv. 2^a 3^c. p. 1123.

³ PETRUS HERIGON, professor of the mathe-

for Feb. 1673.

CHARD, a doctor of physic, answering the doubts started at the meeting of the society Nov. 18, 1669, concerning the way of making vinegar in France, communicated by him. The second from Dr. EDWARD BROWN, dated January 26, 1670, with a Latin one inclosed from PETER LAMBECIUS, the Emperor's historiographer and library-keeper, to Mr. OLDENBURG dated at Vienna October 30, 1669¹, presenting his service to the society, and sending a catalogue of divers chemical manuscripts in the Imperial library, and offering them the liberty of transcribing any of them, and even his readiness to send the books themselves upon caution given. The third from NATHANIEL HIGHMORE, M. D. to Dr. BEAL, dated at Sherbourn in Dorsetshire, Dec. 17, 1669², concerning the salt-spring at East-Chinock in Somersetshire; as also the medical spring, called Far-rington-Well in Dorsetshire, with a small parcel of salt obtained from the salt-spring.

Dr. BALLE related, that he was credibly informed, that four miles from Exeter, at a village called Honeton's Clift, at an alehouse, there was a kind of metal resembling brass, brought from the East-Indies, which, when struck with the finger, or with much softer bodies, would yield a very loud noise; but when knocked with an iron hammer, a low and deadish noise.

This being looked upon as not credible, Dr. BALLE affirmed, that the person, from whom he heard it, assured him, that himself had made the experiment of it; but that the society might do well to direct, that Dr. COTTON, who resided near the place, should be written to to inquire into the truth of that story; and Mr. OLDENBURG was desired accordingly to write about it.

Feb. 10. Mr. HOOKE being absent, the society, instead of experiments, was entertained with the reading of some letters, and the view of some curiosities of nature, sent partly out of New-England by Mr. WINTHROP, governor of Connecticut, partly out of Hungary and Transylvania by Dr. EDWARD BROWN, and partly out of Warwickshire by Mr. WILLUGHBY, all directed to Mr. OLDENBURG for the society.

Mr. WINTHROP's letter was dated at Boston in New-England, Oct. 4, 1669³; and the curiosities accompanying it were,

1. Three dwarf oaks, with cups of acorns in them, the acorns being fallen off, of which yet there were some found in the box, whereof two were given to Mr. CHARLES HOWARD, and one to Mr. OLDENBURG for Mr. EVELYN, to plant them here, and two reserved for the repository.

2. Two broad and one narrower girdle of the Indian money.

¹ Letter-Book, vol. iii. p. 199. Mr. OLDENBURG's answer to LAMBECIUS is dated Feb. 10, 1670. Ibid. p. 242.

² Supplement to the Letter-Books, vol. iv. p.

158. It is printed in the Philos. Transact. vol. iv. n^o 56. p. 1128.

³ An extract of it is printed in the Philos. Transact. vol. v. n^o 57. p. 1151. for March 1670.

3. One white and one blue string of Indian money, and one pair of bracelets for the aged, and one child's bracelet.

4. A small pail made of the bark of a birch-tree.

5. Four sorts of sand, one found on the sea-shore near New-Haven in New-England, the other in St. Christopher's-Island, both metalline; the third very fine of Saco in New-England, taken out of a pond there; the fourth of Virginia.

6. Some winter and summer-wheat, produced in those parts.

7. A sort of snake-weed.

8. Hertford-earth, like terra sigillata, which the cattle eat.

9. A curious sort of moss growing on the trees beyond Virginia towards Florida.

10. Black and speckled beans.

11. Red beans and white in two papers.

12. A lime-stone lately found in New-England.

13. Three stones found in clay deep in the ground at Hertford in New-England.

14. Earth, which being put into common water swims, as wood or cork, for a time, found about Patomack river in Virginia.

15. The horns of a kind of beetle.

16. Flies like moths, which ingender the worms, that spoil apple-trees.

17. The shape of those worms or caterpillars, which spoil the apple-trees, into which form they turn, after they have crept into the earth from the tree; and in this form they lie in the earth, and only in the spring a fly is bred of them like a moth, and they come out of the earth; and from them again are the caterpillars produced.

18. Exceedingly small pismires.

19. Some walnuts, of which one was given to Mr. CHARLES HOWARD, and another to Mr. EVELYN, and the rest reserved for the repository.

20. Three Indian purses or bags, in one whereof were New-England chestnuts. Two of these purses were made of porcupine's quills split.

21. A small dish or porringer of the bark of a tree.
22. A tray made of the root of a tree.
23. Ten pieces of candle-wood, which being lighted burnt with a good flame, and were used by many planters instead of candles. They were split out of the knots of pitch-pine; and tar is made out of such knots.
24. A bag of hazle-nuts grown in New-England.
25. A bag of granat-nuts, with a little paper of very small granats.
26. Two unusual shells.
27. A black stone of Panirhall.
28. Two flying squirrels.
29. Some few granat-stones by themselves, said to have been sent by one THOMAS EDWARDS.
50. Two pretty large shells.
31. Some ears of Indian corn.
32. A comb of the Indian ladies.
33. Shreds of stuff made by the English planters of cotton and wool, put up to shew the colour, which was only dyed with the bark of a kind of walnut-tree, called by the planters the butter-nut-tree, the kernel of that sort of walnut being very oily, whence they are called butter-nuts. They dyed it only with the decoction of that bark, without allum or copperas, as they said.
34. A branch of the said butter-walnut-tree.
35. Some minerals of New-England.
36. A mineral stuff found in a vein of the like kind of sandy stones in digging a trench at Hertford in New-England.
37. A branch of a tree, called the cotton-tree, bearing a kind of down; which yet is not fit to spin. The trees grow high and great. At the bottom of some of the leaves next to the stalk of the leaf, is a knob, which is hollow, and a certain fly, somewhat like a pismire-fly, is bred in those knobs: in some years more leaves have those knobs than in other years.
38. The little-herb, or *hedera trifolia Canadensis*.

39. *Lepides*

39. *Lapides albi minerales.*

40. Speckled, gray, and black beans.

41. The matrices, in which those shells are bred, of which the Indians make their white wampam-peage, which is their money. They grow on the bottom of sea-bays, and the shells are like periwinkles, but larger. Whilst they are very small, and first growing, many are within one of the concave receptacles of these matrices. If any of the little cases be opened, there will be found the *primordia* of those great shells, of which the Indians make their wampam; and many small shells will be found in one case. They may be better discerned as to their full shape by a microscope. These cases are thin and separate from one another; but all fastened one close by another to a membrane-like skin.

In the second box marked B.

1. A fish full of prickles, called the sea-hedge-hog.

2. A flying fish.

3. Three pods of silk-grass.

4. Pieces of the bark of a tree growing in Nova Scotia and the more easterly parts of New-England; upon which bark there are little knobs, which being opened yield a liquid matter like turpentine, said to be of a very sanative and balsamic nature.

5. Five ears of Indian corn of a special kind, said to ripen a month at least before other kinds.

In the third box marked C.

1. Some pine-apples, in number five.

2. Stones full of little holes, in every one of which there was a little living creature like a worm. They are taken under water.

In the fourth box marked D.

An extraordinary kind of fish, somewhat resembling a star-fish, but different from it in divers particulars, and very curiously wrought.

Besides these things, there were likewise sent the head of a deer, not of a common kind, brought from a very remote part of the country by some Indians; two bibles and three books, intitled *The Practice of Piety*, translated into the Indian language; two astronomical descriptions of the comet of 1664; a translation of Mr. RICHARD BAXTER's *Call to the Unconverted* into the Indian tongue, and an Indian grammar.

Mr.

Mr. OLDENBURG then produced Dr. EDWARD BROWN's letter to him, dated at Norwich, Feb. 5, 1673², accompanied with two boxes, in one of which marked A were two sorts of Transylvanian stone-falt, together with another falt in a small box marked B inclosed in the former, such as in those parts is used at table. In the other box marked C there were three sorts of stone-falt from the mine of Eperies in Upper Hungary, 1. A yellow falt. 2. A crystal falt. 3. A blue and white falt.

He next produced a letter written to him by Mr. WILLUGHBY, dated at Middleton, Jan. 29, 1669³, in answer to what had been desired of him concerning worms found wrapt up in leaves in a rotten willow shewed to the society by Dr. CROUNE; concerning which Mr. WILLUGHBY said, that he was able to give no good account of them, having never met with them but once about ten years before in oak-leaves, strangely twisted up, and in the midst of each of them a single egg. But at that time he had observed no farther of them, or without success. He remarks, that all the insects, that are quite imprisoned, and have no holes open for them to fly out at, after they are changed (which those in apples, nuts, and the heads of teasels have) make their way either with their teeth, or a dissolvent liquor, which they spew out. But that it is much harder to conceive, how the old insect should so wrap herself.

He sent with this letter a box containing some insects, and observed, that nature made the theca's, in which those insects were contained, chiefly to preserve them while they lie torpid in winter; and that it is observable, that the torpor seizes upon them in all conditions, 1. Either after they are changed, and come to perfection. 2. Before they are changed; or 3. when they are newly hatched. And that it is with them in that condition, as if the time stood still, they living as long after warm weather hath awaked them, as they would have done from the time the cold first seized them, if they had escaped it. Flies, butterflies, wasps, hornets, &c. are instances of the first sort: of the second the solitary eruca in the teasel-head, which being come to his full growth lies there all winter, and about April changes into an aurelia. Of the last he took those of Dr. CROUNE to be.

With regard to the history of spiders flying, he left that to Mr. MARTIN LISTER, *the first and most ingenious observer*. "Being stirred up, adds he, by his discoveries, I have taken some pains about them, and in September last in a moorish ground saw a great many of several species gotten up to the tops of rushes and grafs, and hanging by their legs. They turned their tails with the wind, and spitted out a web, which was carried in the air to some other bush or plant; and as soon as ever they felt it catch upon any thing, they would immediately turn themselves, and run along the web to the place, where it was hung, and from thence begin their work again. So much I have seen and have witnessed for.

"The noble theory of motion I have not lately meddled with, thinking to

* Letter-Book, vol. iii p. 239.

* Ibid p. 231.

"have

"have my lord of CHESTER's company and assistance in experiments about it
"before this."

This letter of Mr. WILLUGHBY giving occasion to discourse of the generation and changes of those insects mentioned by him, Mr. HOSKYNs related, that one Mr. MORGAN told him, that he had a curiosity to see what it was, that made many holes in some forts of willows and sally's, which he had planted, and which he found dead, as he guessed by reason of those holes. Cleaving some of the trees, he found a long grub or worm, almost of the length of his finger, white, consisting as it were of several joints, and the head yellow, with a strong proboscis and hard teeth, or rather chaps, at the end of it (as wasps have) with which it reduced the wood to little bits like saw-dust. The worm had several legs, and as it eat farther, it grew bigger, as likewise did the hole. At the end of the year it shrinks to a smaller bulk, and sleeps during the winter, and the next summer is a fly. But of that he promised a farther account.

There was presented Dr. MALACHIAH THRUSTON's book, intituled, *De respirationis usu primario diatriba. Cui accedant animadversiones à cl. viro in eandem scriptæ, una cum responsionibus auctoris.*

Feb. 17. There was produced and read a long letter of Dr. EDWARD BROWN to Mr. OLDENBURG, dated at Norwich Feb. 12, 1669, giving an account of several baths in Germany, Hungary, and some parts of Turkey*, and accompanied with a box containing these following particulars:

1. A small box with a stone of the talcum-rock from Spittal in Upper Carinthia.
2. Another small box with a substance taken from the stones at the entrance of the cave, which leads to the spring, that serves the duke's bath at Baden.
3. A box with sulphur taken out of the pipes, which pass the Thermæ at Baden.
4. Another box with a substance taken from the top of the cave, through which the hot springs pass at Baden.
5. A box with a substance incrusting the sides of the sweating-bath at Glashtuten.
6. Another box with a substance growing upon the wood in the baths of Glashtuten.
7. Another box with a substance sticking to the coppers in the boiling of the hot-bath at Manners-dorf.

* Letter-Book, vol. iii. p. 254. It is printed in the Philos. Transact. vol. v. n^o 59 p. 1044. for May 1670.

8. Muscovy glass from Mount Hæmus.

9. Several mineral stones, seven in number, two of which were incrustations about wood.

Mr. Hooke produced a piece of staining improved.

He promised for the next meeting an anatomical experiment concerning the lungs.

February 24. Mr. Hooke reported, that the anatomical experiment concerning the use of the lungs, which he had promised to make in private, had not succeeded, but that he intended to try it again betwixt that and the next meeting.

He shewed an experiment to illustrate, how the figures of trees, that are naturally made upon divers stones, may be formed by art; which he did by rubbing two polished marbles together, between which there was put some water, so that after they had been a little while rubbed together, and were thereupon so drawn, as that some air might intermix and dilate the water, there appeared plain figures of the form of trees. Whence it was conjectured, that the like figures, formed by nature upon sundry stones, might be made by some water oozing through stones, and working upon them, air being intermixed and dilating the liquor.

Mr. OLDENBURG produced and read three letters to himself, one by Monfr. HUET¹, dated at Paris February 22, 1670, N. S. ², containing an account of a method found out there for making sea-water fresh, by precipitation, with oil of tartar: The second by Mr. FRANCIS VERNON, secretary to Mr. MONTAGU, the English ambassador to the court of France, dated at Paris Feb. 25, 1670³, mentioning a printed paper sent by Monfr. HUYGENS to Mr. OLDENBURG *de Particulis Et Halionibus*; as also the depositing of some written papers of Monfr. HUYGENS in the hands of Monfr. VERNON, together with his desire, that they might be sent to the Royal Society in case of his death, he being then sick; on which occasion he expressed a very great esteem of the society, and much confidence of the stability of their institution beyond any other philosophical society. The third by Mr. FLAMSTEAD, dated at Derby, Feb. 7, 1670⁴, expressing his acknowledgments to the society for the favourable reception of his astronomical discourse lately communicated to them.

Monfr. HUET's concerning the way of making sea-water fresh occasioned some discourse upon the salubrity of such water, when made fresh; some alledging, that in the dissolution there came over with the sweet water a corrosive volatile salt, which had a noxious quality for human bodies; and others adding, that possibly that noxiousness might proceed from the want of air in the water so distilled, sup-

¹ PETER DANIEL HUET, afterwards bishop of Avranches in France, well known by his writings. in the Philos. Transact. vol. v. n° 67, p. 2048, for January 1674.

² Letter-Book, vol. iii. p. 253. It is printed

³ Letter-Book, vol. iii. p. 267.

⁴ Ibid. p. 237.

posing the necessity there is of a competent quantity of air in all things, that are to feed the bodies of men.

Whereupon it was remarked by Dr. GODDARD, that distilled waters had as much air in them as undistilled, they being of the same weight. He was therefore desired to repeat some trials of the weight of distilled waters compared with that of the undistilled ones.

The relation of the way of making sea-water fresh intimating, that one of the things, whereby it was performed, was a precipitation made by oil of tartar, it was alledged, that by this oil of tartar the saline parts of the sea-water seemed to be as it were chained, and kept back, so that they could not come over the helm, &c.

March 3. Mr. JEFFREYS gave some account of the two stellar eclipses lately observed by him and Mr. HOOKE; which he was desired to bring in writing at the next meeting.

Mr. OLDENBURG produced a letter to the president from Mr. EVELYN, accompanied both with an engine for the more equal sowing of corn and with the description of it*; by which engine a great quantity of seed-corn is said to be saved, and a greater crop gained. The description was translated by the earl of SANDWICH from the Spanish into English; the engine being used in Spain, and in such a manner, that being fastened to a plow, it plows, sows, and harrows at once.

Some of the members remarked, that there was such a kind of engine, at least for equal sowing, in England, and that it had several times been used with good success and advantage, but that people are so attached to their old way, as to neglect the use, though more beneficial, of a new one.

The bishop of CHESTER added, that one of these engines had been made by the society's operator, and put in practice by himself; and that it was lent to one Mr. BUCKLEY in Surrey near Banstead-Downs.

Mr. EVELYN having moved in his letter, that the description of the Spanish engine might be printed in the *Philosophical Transactions*, it was ordered, that Mr. HOOKE should be desired to consider this Spanish engine, and put it into order, and likewise make a scheme and description of the English, to be published together.

THOMAS WILLISEL being returned from his journey, produced before the society several minerals, fishes, and birds, which he had collected. Among the birds, which he had met with in Ireland, there were some with three beaks, having two passages, one of which was thought by Dr. GLISSON to serve for breathing, the other for swallowing.

* This letter and the description of the engine are printed in the *Philos. Transact.* vol. v. n^o 60. p. 1055, for June 1670.

It was ordered, that Dr. POPE, Mr. JEFFREYS, and Mr. HOOKE do inform the said THOMAS WILLISEL of such natural things, as may be had in England, and were yet wanting in the society's repository, and that the said WILLISEL take order and directions from them what to inquire after and bring home for the future.

Mr. OLDENBURG signified, that Dr. JAMES DU MOULIN desired, that the society would do him the favour to certify, that upon their desire he had translated the *History of the Royal Society* into French, and that he had now satisfied their desire. It was ordered hereupon, that such a certificate be granted him, and signed by the president, in the following form :

" Noverint universi, ornatissimum Dominum JACOBUM DU MOULIN, M. D.
 " rogatu Societatis Regiæ Londini ad Scientiam naturalem promovendam institutæ,
 " traduxisse in sermonem Gallicum Historiam prædictæ Societatis à THOMA
 " SPRAT, S. T. Doctore linguæ Anglicæ adornatam. Londini die 3 Martii
 " 1672."

Mr. CHARLES HOWARD intimated to the society, that he had now recovered the lost art of making red glass; as also that he had extracted without any addition out of the spar of the Derbyshire lead mines a liquor of an acid taste and a strong smell. He was desired to produce a piece of plate of that glass, if he could conveniently do it, and also some of the liquor.

Sir ROBERT MORAY was desired to take with him for a trial some of the metal, which THOMAS WILLISEL said was called a new metal, found in Yorkshire upon Ingelberry-hill; which Sir ROBERT did accordingly.

March 10. There was produced some fagots of red-streak glass sent by Mr. READ out of Herefordshire for the use of the society; which were distributed to several of the members, as the lord ASHLEY, Sir PAUL NEILE, Sir CYRIL WYCHE, Dr. SMITH, Dr. BALLE, and Mr. HOOKE.

An experiment was made in the artificial tin-arm of Dr. GODDARD's contrivance, to find, whether pulsation was made by an intumescence of the artery, or not? And it was found by several trials, that as the pulse beat, so the water rose in the glass-cane adapted to the said tin-arm: And this was found to hold in many pulsations, even to forty strokes; but the water was observed to ascend unequally in the glass.

This phenomenon being put to the debate, some of the physicians, and particularly Sir GEORGE ENT, Dr. CLARKE, and Dr. GODDARD thought it not cogent, to conclude from the rise of the water an intumescence of the artery; but were of opinion, that that ascent might proceed from the mere vibration of the artery without swelling of the same, especially considering, that the coat of the artery was not easily capable of distension, and that the smallness of the quantity of blood passing at every pulsation out of the heart into the artery, and being added to so great a quantity of blood in the body, could hardly make a sensible dilatation.

Dr.

Dr. CROUNE mentioned an observation of his, by which, he thought, it appeared, that at the same time, when there was a systole in the heart, there was also a systole in all the arteries; so that the blood passed at one and the same time out of the heart into the arteries, and out of the arteries into the veins.

It was moved, that experiments might be thought of, to find, whether indeed the arteries were apt to be distended, and it was suggested, that it ought to be considered, that there was not so great a quantity of blood in the arteries, in regard there was so much of it in the veins and in almost all the parts of the body.

Mr. BOYLE moved, that a wire might be put in the instrument, and fastened to it; which being fillipped in the water, might shew, whether the water might then rise, as well as it did at the time of the pulsations of the artery.

Dr. GODDARD moved, that a dog might be opened, in order to observe carefully the pulsations of the heart and the artery.

It being intimated by him, that the bore of all the ends of the capillary arteries, taken together in bulk, was probably of the same capacity with the single great bore of the artery receiving the blood of the heart; and that therefore the blood might pass out of the arteries as easily as it came in, and therefore needed not to distend them; Mr. LOCKE desired, that it might be considered, that though that were so, yet there was more superficies in the whole bulk of all the ends of the arteries together than in the single great artery.

March 17. An experiment was made with long pendulums, having two leaden balls of equal weight fastened to them, and moving the one in water, the other in air, to see the difference of the resistance of the two mediums to them. It was found, that the pendulum moving in the air made thirteen vibrations, whilst that in water made but twelve.

It was suggested, that it would be proper to try this experiment in a large exhausted receiver with a long cane to it, to see how long the pendulum would move, before it stops, and afterwards to try it also in compressed air; which experiment was ordered to be made at the next meeting.

Mr. OLDENBURG produced a letter from Dr. EDWARD BROWN, dated at Norwich, March 8, 1676^a, giving notice of some minerals sent by major BENDISH, which were delivered at this meeting by the said major, and came accompanied with an answer to several queries formerly recommended to the Doctor^b, who also sent a draught and description of a burning, melting and driving furnace.

The particulars delivered were these:

^a Letter-Book, vol. iii. p. 280.

^b *Ibid.* They are printed in the *Philos.*

Transact. vol. v. n^o 58, p. 1189, for April 1676.

In a box marked A.

1. A little box of pure cinnabar out of the silver-mines at Schemnitz in Hungary.

2. Silver-ore with cinnabar growing upon it from Schemnitz.

3. Cinnabar out of Tyrol.

4. A rich piece of cinnabar sent out of Carinthia.

5. Brown cinnabar out of the forest of Cre not far from St. Veit in Carinthia.

6. A large piece of cinnabar from Carinthia mixed with other substances.

7. A stone like a bone digged from under the root of a tree in the forest of Cre, having cinnabar with it.

In a long box.

BB. Two boxes of amethysts, amethystin-tinctures and crystals, as they shoot or grow in the mines at Schemnitz.

C. Silver-ore from Schemnitz; the longest piece from the Trinity-mines.

DD. Two little boxes of natural vitriol.

E. Bolus found nigh Schemnitz.

F. Kys, a sort of pyrites.

G. Glas-flacker, a vitrified substance to make lute of, for covering the glass-bodies in the separating furnaces at Schemnitz.

The exhibiting of these gave occasion to discourse of the way of reducing ore into metal; upon which Sir ROBERT MORAY suggested, among others, the following queries to be farther proposed to Dr. BROWN:

1. What is the least quantity of silver in ore, which makes the person employed in that business think it worth the pains of working it?

2. What are the particular expences from the first working to the refining? What the lead stands them in, and what are the charges of refining?

3. How lead is wrought here in England, and to compare it with their working in Germany and Hungary?

4. Whether the ore be not sometimes melted at the first burning? Why not then, as well as at the second burning?

5. Which

5. Which way they reduce litharge into lead again?
6. Whether there be silver in any other base metal but lead?
7. Whether it be all wood, no coal, which they use in this work?
8. How they make their assays?
9. What kind of balance they use, and the description thereof?
10. Whether they put all their lead, that is to be refined, into the cupula?
11. To desire a more exact and more particular description of the furnaces.

Mr. CHARLES HOWARD presented from his brother the lord HENRY HOWARD the following curiosities,

1. Two pieces of amber, one like an heart, with flies in it; the other like a bead, with an ant in it.
2. A little piece of the rock, to which some amber was yet fastened; the two pieces of amber abovementioned having been digged out of a rock about Tangier, when the rocks were broken there for the mole.
3. Two Roman coins, one larger than the other; the larger found about Tangier, the less at Fez.

Mr. OLDENBURG produced a French paper brought to him by Mr. VERNON, secretary to the King's ambassador at Paris, containing a discourse of Monfr. MARIOTTE concerning the organ of vision, viz. Whether it be the retina or choroïdes; a dispute lately raised between him and Monfr. PECQUET: Which discourse Mr. VERNON had been desired to recommend from the author to the favour of the Royal Society for their perusal and consideration before the publication of it.

It was ordered, that Mr. HENSHAW should be desired to translate it into English against the next meeting; and that it should then be considered by such of the members, as the society should appoint for that purpose.

March 24. Mr. HOOKE being called upon for the experiment of moving a pendulum in an exhausted receiver said, that Mr. BOYLE, since the last meeting, had told him, that there was no sensible difference between the celerity of a pendulum's motion in the air and that *in vacuo*. However it was ordered, that this experiment should be made before the society at their next meeting.

Mr. HOOKE made a report of the observations made by himself and Mr. JEFFREYS of two late stellar eclipses predicted by Mr. FLAMSTEAD, which happened

ed February 25 and March 3, 1666; concerning which he said, that in the former they could not see the sub-ingress, but saw the egress, the time of which agreed very near with that assigned by Mr. FLAMSTEAD: And that in the latter they observed the time of the sub-ingress 17 h. 2 m. which differed considerably from the time calculated by Mr. FLAMSTEAD: And they added, that they expected the egress till 18 h. 45 m.; but that the day then clearing up, and the smoke and vapours ascending, they lost the sight, which they had, of the moon. These observations were made with a six foot telescope.

On this occasion it was remarked, that Mr. FLAMSTEAD had affirmed, that though the almanack-makers had omitted the eclipse of the sun on 9 April following, as invisible here, yet he had by his calculation from the curve-line tables found, that a part of the said eclipse, if the air were serene, would be conspicuous in these parts; which calculation was published, with the whole calculus, in the *Philosophical Transactions*, n° 55.

Mr. OLDENBURG produced another present of minerals from Dr. EDWARD BROWN, together with a catalogue and description of them in a letter written by him to Mr. OLDENBURG at Norwich March 21, 1666.

The particulars were these:

Gold ore from Chreminitz.

Antimony of gold.

Ore from Chreminitz containing silver and gold.

Vitriol earth; the vitriol made out of that earth from Chreminitz.

Copper ore out of the mine of Herrn-ground near Newfel in Hungary.

Black copper ore, containing also silver.

Berg-grune.

Four sorts of vitriol, white, green, blue and reddish.

A stone lately discovered in the copper-mines at Herrnn ground; which was ordered to be polished on one side.

A stone said to be the mother of the Turquoise.

Iron turned into copper; one piece melted; a chain and heart of iron, now copper. This heart being filed proved still iron within, but the outside was copper.

Antimony ore from Transylvania.

Natural vitriol crystallized in the mines of Chremitz.

THOMAS WILLISEL brought in a small collection of sea-plants lately gathered by him on the sea-shore in Kent.

Mr. HOWARD was desired to try, whether any of them would grow in a garden.

Mr. OLDENBURG read a letter to him from Dr. WALLIS, dated at Oxford March 19, 1670^a, containing his answer to some animadversions of Mr. CHILDREY on his hypothesis of tides^b. And it was ordered, that a copy of the Doctor's letter should be sent to Mr. CHILDREY as most concerned in the answer.

Mr. HENSHAW produced his translation of Monfr. MARIOTTE's paper concerning the principal organ of vision; which was ordered to be read at the next meeting.

March 31. The number of members present being but small, and the president and all his vice-presidents absent, nothing was done at this meeting.

April 7. Dr. CROUNE undertook to write to the earl of AYLESBURY, to make several trials to discover what minerals or salts were contained in the medicinal waters of Bourbon in France; and to send the products of them to the society, together with the measure or weight of the water, from which they were taken.

It was ordered, that Mr. FLAMSTEAD be requested by Mr. OLDENBURG to proceed in making his calculations; and to inform him, that Mr. HOOKE would undertake to make the observations.

Mr. HOOKE was desired to find out a place to make his observations of the sun and stars by a new way, which he then proposed.

It was desired, that Monfr. MARIOTTE's paper concerning the principal organ of vision should be printed in the *Philosophical Transactions*^a, and as much of Monfr. PECQUET's, as gave occasion to that discourse.

April 14. Monfr. GUSTAVUS HELMFELD, a Swedish gentleman, was proposed candidate by Monfr. LEYONBERGH, the Swedish resident.

The experiment of moving two pendulums of equal length and bigness with two leaden balls of equal weight, the one in the open air, the other in an exhausted receiver, was made; and it was found, that that in the receiver moved a

^a Letter-Book, vol. iii. p. 355. It is printed in the *Philos. Transact.* vol. v. n^o 64. p. 2059, for Octob. 1670.

^b Letter-Book, vol. iii. p. 316, and *Philos.*

Transact. p. 2051.

^c It is printed vol. v. n^o 59. p. 1023, for May 1670.

considerable

considerable time longer than that in the open air, which latter was set at somewhat a bigger arch, to give it the advantage over the other.

This experiment was ordered to be made at the next meeting in such a manner, that a gage be put in the receiver, to see what air it holds; as also to put both the pendulums in receivers, one exhausted, the other not; thereby to keep the latter as well as the former from the agitation of the air: and farther, to try it with balls of light materials, as cork, sealed bubbles, &c. to make the disproportion appear the more.

An experiment was made to represent the thickening and clearing of the air by a glass filled with a clear solution of copper, which having another liquor poured into it became thick, by having some of its particles precipitated, and then another liquor being infused into it, cleared up from the bottom, and represented clouds hanging in the midst of the liquor, and by little and little exhaling into the air.

Mr. OLDENBURG read a paper sent him from Rome concerning an observation about the present declination of the magnetic needle, made there by Monsr. Auzout³, and shewing, that at present it declined there about two degrees Westward, whereas of late years it had declined several degrees Eastward.

This being agreeable to what was asserted by Mr. HENRY BOND, whose hypothesis of the motion of the magnet led him to affirm, that this year the variation at London would be 2° 18', it was ordered, that Mr. Hooke should direct an easy and sure way to describe an exact meridian; and that then observations should be made, to see how far they verified Mr. BOND's hypothesis.

Mr. Hooke suggested a method for striking exact meridians by the North star, and by observing the time of the night.

There were produced some papers sent by Dr. WALLIS to Mr. OLDENBURG, containing Mr. HENRY HYRNE's objections 'against the doctor's hypothesis about the tides, together with a general answer to them'; as also concerning Mr. HYRNE's new hypothesis of tides⁴, together with a scheme. These papers were ordered to be read at the next meeting, the scheme being directed to be drawn in great by the amanuensis.

April 21. Monsr. HELMFELD was elected and admitted.

An experiment was made with two pendulums, having two leaden balls of equal weight appended to them, the one hanging in the open air, the other in a tun of water, in which it was immersed about a foot deep: and it was found, that the

³ It is printed in the *Philos. Transact.* vol. v. p. 58 p. 1184. for April 1670.

⁴ In a letter to Dr. WALLIS dated at Parsons Green Feb. 23, 1682. Letter-Book, vol. iii. p. 326.

* Dr. WALLIS's answer is dated at Oxford

March 9, 1692. *Ibid.* p. 428.

⁵ In a letter to Dr. WALLIS dated April 2, 1670. *Ibid.* p. 230. Dr. WALLIS's reply is dated April 4. *Ibid.* p. 350.

pendulum in the air made twelve vibrations, whilst that in the water made but eleven.

It was ordered, that an account should be brought in of the experiments made of this kind to be entered in the Register-Book.

Mr. HOOKE brought in his instrument to observe the motion of the sun to seconds; which was ordered to be produced again at the next meeting, and to be tried upon the leads of Arundel-house, if the sun should shine.

Mr. OLDENBURG read Mr. HVRNE's hypothesis of the flux and reflux of the sea opposed to that of Dr. WALLIS, the author asserting himself to be as fully satisfied concerning the cause of this phenomenon, as of any thing in nature. This hypothesis suppoith a motion of the earth from North to South every six hours and a few minutes, and back again in as long a time: and that, on the same side of the equator, the tides are at the same time all the world over, without any reference to the moon's being at or near the meridian; and that the spring-tides at change and full are no otherwise depending on the moon's motion than barely by a synchronism. The like motion he affirmed to be in all the planets, viz. directly from North to South and from South to North again. From this hypothesis of the motion of the terraqueous globe, Mr. HVRNE said, that if it proved true, seamen might infallibly conclude in what longitude they were, being in the open sea; and that this would be a great furtherance to the discovery of the North-East or North-West passage.

The whole was recommended to the farther consideration of Dr. WALLIS, who was present.

Mr. HOOKE intimated, that he had another hypothesis concerning the tides different both from that of Dr. WALLIS and that of Mr. HVRNE, which, when he had perfected it, he would communicate to the society.

He was desired to give in writing a description of the experiment made by him at the last meeting, representing the serenity and cloudiness of the air by the successive infusion of two different liquors into a solution of copper; which he promised to do.

THOMAS WILLISEL brought in some plants gathered by him in Norfolk and Suffolk, which were recommended to the care of Mr. CHARLES HOWARD.

Mr. HOOKE was put in mind of observing the declination of the needle, of prosecuting the experiments of the motion of pendulums in the air and the exhausted receiver, and of the motion of the blood in animals out of the veins into the arteries without the concurrence of the lungs.

Mr. HENSHAW produced the manuscript of *IAENÆUS* borrowed by him of the society Feb. 25, 1670.

VOL. II.

K k k

April

April 27. At a meeting of the COUNCIL were present

The lord bishop of CHESTER vice-president

Sir ROBERT MORAY
Sir ROBERT SOUTHWELL
Dr. BALLE
Mr. CHARLES HOWARD

Mr. COLWALL
Mr. CREED
Mr. OLDENBURG.

It was ordered, that the treasurer continue to pay to Mr. Hooke his salary of thirty pounds a year from the time of his last payment, which was appointed to be made to him by an order of the council of Feb. 1, 166⁵:

That the lord BRERETON, Mr. CHARLES HOWARD, and Sir ROBERT MORAY, or any two of them, be desired to speak with Mr. CHENEY concerning those acres, which he had yet in lease of Chelsea-college, and the exchanging some parcels of land with the same, and to be mindful to do so in the month of June next, that being the time, when, according to the report of the lord BRERETON to the council June 10, 1663, it would be in Mr. CHENEY's power to treat with the society concerning that land: and

That N^o 58 of the *Philosophical Transactions* be licensed.

April 28. At a meeting of the SOCIETY,

It was ordered, that the operator should immediately bespeak a glass-tube as large as could be made, and eight feet long at least, for making experiments of the descent of bodies in water: and

That the instrument contrived by Mr. Hooke for observing the motion of the sun be produced again at the next meeting.

He exhibited his contrivance of the glass-tube posited perpendicularly, for observing the stars in the zenith, to try to find the parallax of the earth's orb, in order to determine the question of the earth's motion. He was solicited to carry on these observations with care and diligence.

Mr. OLDENBURG produced several specimens of the parts extracted out of the Scarborough Spa by ROBERT WITTIE, M. D. together with his discourse concerning it*, in which he affirms, that he had found a body of minerals, which he took to be the product of those five, esteemed by him to be contained in that Spa, viz. iron, vitriol, alum, nitre, and salt, and to have a compound taste of sharp, salt, acid, and somewhat stiptic, and a *tertium* different from them all: adding, that he had extracted an ounce of five quarts, and that in dry years the same quantity will yield ten drachms.

* I. is printed in the *Philos. Transact.* vol. v. n^o 60. p. 1074.

May 5. Mr. Hooke brought in his instrument for observing the motion of the sun to seconds; and the experiment being made but imperfectly, it was ordered, that the said instrument should be fitted against the next meeting with a ball and socket to keep it steady.

Dr. CHRISTOPHER WREN produced a new contrivance of his for a more convenient winding up of weights by ropes, and serving for wells, mines and cranes, and thought applicable to clocks. He had considered, that the ways till then used in all engines for winding up weights by ropes were but two, viz. the fixing one end of a rope upon a cylinder or barrel, and so winding up the whole coil of rope; the other by having a chain or a loose rope, catching on teeth, as is usual in clocks. But finding, that both these ways were inconvenient, the first because of the riding of much rope in winding one turn upon another; the second, because of the wearing out of the chain or rope upon the teeth, he, to prevent both these inconveniences, devised another to make the weight and its counterpoise bind on the cylinder, which it will do, if it be wound three times about. But because it will then in turning, screw on like a worm, and will need a cylinder of a very great length, therefore if there be two cylinders, each turned with three notches, and the notches be placed alternately, the convex edges to the concave, the rope being wound three times about both cylinders, will bind firmly without sliding, and work up its weight with a proportionable counterpoise at the other end of the rope.

This being thought applicable to clocks, Mr. Hooke was ordered to make a trial of it.

The president produced a letter to himself from the lord HENRY HOWARD, his Majesty's ambassador extraordinary to the emperor of Morocco, dated at Cadiz, Feb. 21, 1670, declaring his excellency's readiness to serve the society abroad, and intimating what collection of curiosities he had made for them, and reserved by him to present at his return; sending in the mean time a very curious piece of a silver-stone, interlaced with a quantity of perfect silver; which was delivered to Mr. Hooke for the repository.

It was ordered, that solemn thanks should be returned to his excellency as from the society, and the letter be forthwith drawn up by the secretary and signed by the president^a.

Dr. KING produced some willow-wood, containing several worms wrapt up in leaves, and lodged in several channels made by themselves, which he had received from Sir JOHN BARNARD out of Northamptonshire. There being three pieces of it, one of them was delivered to Mr. Hooke for the repository, the other to Mr. OLDENBURG for Mr. WILLUGHBY, and the third was kept by Dr. KING to observe what insect it would produce.

^a It was dated May 10, 1670, and entered in the Letter-Book, vol. iv. p. 18.

May 12. The society did not sit, as the number present was but small.

May 19. Mr. HOOKE produced an engine, that may serve for a wind-gun, and be more easily charged than an ordinary one, and yet shoot as certainly as that. But the valve being yet wanting, it was ordered, that it should be made ready against the next meeting.

It was also ordered, that the variation of the needle should be observed by Sir ROBERT MORAY and Mr. HOOKE at Whitehall on the 1st of June following.

Mr. HOOKE was put in mind to get a ball and socket made against the next meeting for the instrument of representing the sun's motion to a second.

The operator was ordered to procure at Woolwich a glass body as long and wide as can be made, for making experiments of the descent of bodies in water.

Mr. OLDENBURG mentioned, that he had been informed by a letter from Paris, that Monsr. MARIOTTE, intending to observe the winds there from time to time for several years together, and endeavouring to get the same thing done in other parts of France and of the world, desired, that the like might be observed in England, he conceiving, that thereby might be discovered useful things in navigation, especially in predicting what winds would blow.

It was ordered, that a weather-cock should be bespoken by Mr. HOOKE, such a one, as Dr. WREN had formerly contrived, for observing not only the winds and their quarters and degrees of strength, but also the quantities of rain, and other particulars relating to the temperature of the air.

Mr. OLDENBURG informed the society, that in a late conversation of his with capt. GUILLAUME, who was the year before in East Hudson's Bay, where the center of the beaver trade is, that he had received some information concerning that voyage and country upon divers questions, which he had proposed to the captain. The paper was read, and ordered to be kept on the file ^u.

May 26. Mr. HOOKE produced an optical experiment, whereby the representation of objects in a dark room furnished with a lens is made applicable to painting, so as to exhibit and draw in colours the face of a man or any other object as big as the life.

It was ordered, that against the next meeting something should be designed, and, if it could be, painted, by the means of this instrument.

It was suggested, that whereas the pictures represented in the darkened box are inverted, they might be reverted by the reflexion of a flat piece of metal; though others were of opinion, that this would alter the colours of the objects represented.

^u See the minutes April 18, 1672.

Sir ROBERT MORAY was reminded to make an observation of the variation of the climate together with Mr. Hooke.

Dr. CROUNE produced a printed paper in Latin published at Leipzig in Germany, in imitation of the *Journal des Sçavans* and the *Philosophical Transactions*, under the title of *Miscellanea curiosa*; as also a written paper sent him by Dr. JOACHIMUS ELSNERUS from Breslaw, containing an account of a cure performed on a diseased eye by means of the aqueous humour of an *uro-gallus* or *cock of the wood*, thought possible to be performed by the same humour of other birds.

Mr. OLDENBURG produced a book in Latin, sent him from Venice by the author, Signor FRANCESCO TRAVAGINO, printed in 4to in 1669 under the title of *FRANCISCI TRAVAGINI super observationibus à se factis tempore ultimorum terre-motuum, ac postissimum Ragusiani physica disquisitio, seu gyri terre diurni indicium*.

The president was desired to peruse this book, and to give his thoughts of it to the society.

Dr. EDWARD BROWN presented some more minerals, which he had met with in his late travels, viz.

1. Silver ore from Kottenberg in Bohemia.
2. Silver ore from Freyberg in Misnia.
3. Sulphur ore from Freyberg.
4. Litharge.
5. Silver ore slacken from Freyberg.

These were accompanied with a discourse upon them in a letter to Mr. OLDENBURG, dated May 20, 1670ⁿ, which was as follows:

“ Sir,

“ **A**T Kottenberg, eight Bohemian miles from Prague are about thirty silver-mines: the hills about the town are not very high, some of the deepest
 “ mines are sixty and some seventy fathom deep. They have worked here seven
 “ hundred years. I went into that mine, which was first digged, but was after-
 “ wards left for a long time, but now they dig there again; it is called the Cotna.
 “ A monk walking over the hill, in which this mine is, found a silver-tree sticking
 “ to his garment, which gave the occasion, as they still report, of searching after
 “ silver in the parts, and of digging this first mine. The largest mines are at
 “ some distance from the town northward, where they have also their melting
 “ furnaces; the river Elbe being nigh to help them in their work. That mine,
 “ into which I descended by ladders, nigh to the town, is nineteen fathom deep;
 “ the chief vein of ore runs South, about a foot in breadth; the ore containeth

ⁿ Letter-Book, vol. iv. p. 23.

“ silver and copper, so as out of 100 lb. of ore they ordinarily get an ounce, or
 “ an ounce and half of silver, and nine or ten ounces of copper. A blue earth,
 “ which they meet with in digging, is the most certain sign they have that they are
 “ nigh some vein of ore. Not long since two men died in this mine having made
 “ a fire in it a little before. Some of the ore of this mine is here at your service.

“ Nigh to Freyberg in Misnia are divers remarkable silver-mines; some are at
 “ an English mile distance, others at two; and some are nearer to the town.

“ The mine upon the high hill is considerable for its depth; it being deep above
 “ seventy fathom of that country, as I was informed, each of which fathoms
 “ containeth twelve of their ells, and three of their ells make almost two of our
 “ yards; a depth exceeding any mine I have observed elsewhere.

“ In another mine, called the Himmelfurt or Prince of Heaven, was found
 “ ore not long since so rich, as in 100 lb. weight to contain 130 marks of silver,
 “ or 65 lb. in an hundred; but there was not much of it, and where the veins are
 “ richest they are observed to be thinnest, of a finger or two fingers breadth; but
 “ the ordinary ore holdeth but an ounce or an ounce and half in 100 lb. weight
 “ or not so much; for, if it holdeth but half an ounce, they work it, having
 “ many helps to open the body of the ore, whereby it may be melted, as a sort
 “ of silver-ore containing lead in it, and the brimstone-ore, which is found here,
 “ and lead; also the dross of the metal taken out of the pan and burned two or
 “ three times in an open furnace.

“ The *virgula divina* is used here.

“ The greatest inconvenience to them is the dust in the mines, which doth spoil
 “ their lungs, and fret their skins.

“ They have divers sorts of ore, which contain either silver and copper, silver
 “ and lead, or all three; but they work the ore only for silver.

“ Brimstone-ore is also digged out of some of these mines: it is hard and stony,
 “ that which hath red spots is the best. They use a particular furnace to melt the
 “ brimstone from its ore, the richest of which yieldeth 3 lb. of brimstone out of
 “ 100 lb. of ore, which, as it melteth, runneth out of the furnace into water, and
 “ is once again melted and purified. Some of the brimstone-ore containeth silver
 “ in it, and some copper, and some in a small proportion both.

“ After that the brimstone is melted from its ore, the remainder serveth either to
 “ the melting of silver-ore, or to the making of vitriol.

“ To the former thus; a portion of it is cast into the melting-furnace with the
 “ silver-ore, to this end (to use the miners expression) to make the silver ore, which
 “ is too hard, fluid.

“ To

" To the latter, viz. to the making of vitriol, thus; they take the ore, out of which the brimstone hath been already melted, and burn it once again, or let it continue burning some time in the open air: then putting it into a large fat or vessel, they pour water upon it, and after some time let it out and boil it to a convenient height; then pour it into long troughs, in which are set up many cross sticks, and the purest crystallised vitriol adhereth to the sticks; that in powder to the sides and bottom of the trough. I am,

" Sir,

May 20, 1670.

" your humble servant,

" EDWARD BROWN."

Dr. CROUNE acquainted the society, that Sir NICHOLAS MILLET had mentioned to him, and Mr. HOOKE, that he had a manuscript of his own writing, which contained the observations of the variation of the needle made for seventeen or eighteen years in the same place. And they were desired to procure a sight and perusal of that manuscript for the society.

Mr. COLWALL mentioned, that there was lately returned from Suratta one capt. CHAMLET, who had made his voyage in four months and a half. It was intimated, that he might be desired to shew his journal.

June 2. The experiment of applying the representation of the outward objects in a dark room to painting was repeated; and it being doubted, whether if any false line were drawn this way, the painter could correct it, it was ordered, that some picture should be drawn against the next meeting.

Dr. KING produced a *calculus humanus* of about thirty-two ounces weight, which some years ago had been taken out of the bladder of one Mr. NICHOLAS BYFIELD*. He was desired, since the owner of the stone would not part with it, to get it cast in its full bigness and exact shape, for the society's repository.

Sir THEODORE DE VAUX produced a letter written to him by Mr. WALSH, May 18, 1670, containing some remarkable observations, one especially concerning a great number of millepedes voided by stool, all living, by a child of six years of age.

The president gave an account of Signor TRAVAGINO's book concerning the observations made by him at the time of some late earthquakes, and especially that at Ragusa, tending to prove the diurnal motion of the earth by a certain lateral vibrating from West to East, which he had observed at Venice in two earthquakes, beside the perpendicular subverting motion in the same.

* Probably that eminent divine, who was vicar of Iffeworth in Middlesex, where he died in 1662. See WOOD's Athen. Oxon. vol. i. col. 473.

The author was commended for having published this observation and his conjecture thereupon, that others might take the more particular notice of such a motion upon occasion.

June 9. The dark box for painting all sorts of objects was produced again with some improvements, which were chiefly two, viz. the changing it into a convenient posture for drawing, and the representing the figures direct: but the latter being done only by a looking glass, which takes off much of the brightness of the picture, Mr. Hooke thought, that a metalline plate well polished would do much better; and he was ordered to try to make a picture that way at the next meeting.

It was ordered also, that Sir ROBERT MORAY and Mr. HOOKE should meet at Whitehall the night following, in order to observe the present variation of the needle; and that the latter prepare things necessary for that observation.

Mr. HOOKE was ordered likewise to make ready for measuring a degree upon the earth in the next vacation. The place to do it in was appointed to be Bedford-river about twenty miles in length, formerly surveyed with exactness by Mr. MOOR.

Dr. WREN, his Majesty's surveyor*, mentioned, that in the survey, which was made of the old and new river of Ware, there had an estimate been made by him of the quantity of the water, which they hold, by the velocity and solidity of the rivers.

Sir ROBERT MORAY made inquiry, what trials had been made by any members of the society concerning the grafting of cyons of fruit-trees upon forest-trees.

Mr. EVELYN said, that he had tried apples upon elms without success.

Mr. HOSKYNs affirmed, that at Farrington in Berkshire quinces had been grafted with very good success upon willows.

Another member mentioned, that it was common and successful to graft pears upon white thorns.

Dr. GODDARD suggested, that it would perhaps not be amiss to observe affinity in this kind of grafting, as to graft cyons of chefnuts on oaks.

Others suggested, that apples might be tried on oaks, and walnuts on ash-trees, &c.

Sir ROBERT MORAY mentioned an invention to increase the force of sounds for hearing at a great distance. The figure of the instrument was said to be like that

* He had been appointed to that office in the room of Sir JOHN DENHAM, who died in March 1665.

of a cornet, very large at the mouth, to move in at with liberty all the organs of speech, and so both to magnify the sound, and to articulate it.

The inventor, Sir SAMUEL MORLAND, bart. was said to entertain hopes to improve it so, as to make a man's voice to be heard at the distance of five, and perhaps more miles.

June 16. The SOCIETY did not sit.

June 23. Sir ROBERT MORAY and Mr. HOOKE made a report, that on the 13th instant they had made an observation to find, whether there was now a difference of the present meridian from that, which was formerly made on the dial in Whitehall garden^s. They made their observation by the North star in this manner. At 10 h. wanting 4 minutes they began to observe; the said star being to be just East at 1 b. $\frac{1}{2}$: they hung on poles perpendicular threads, which covered one another and the star, and the South-east side of the said dial. The breadth of the dial's upper edge to the opposite was 4 feet $4\frac{1}{2}$ inches, and the plane between the two perpendicular threads was distant from the North-east edge of the dial 3 inches wanting $\frac{1}{4}$ part, which gives the angle of the pole's distance Eastward from the meridian of the dial. Here the breadth of the dial gives the radius, and the distance of the plane between the two perpendiculars gives the tangent. Then the difference between the distance of the star from the pole, and the distance of the plane between the perpendiculars from the side of the dial, gives the distance of the dial from the meridian, if any there be.

June 28. At a meeting of the COUNCIL were present

The President

Sir PAUL NEILE
Sir ROBERT SOUTHWELL
Dr. CHRISTOPHER WREN
Dr. GODDARD
Mr. HENSHAW
Mr. COLWALL

Dr. SMITH
Dr. BALLE
Dr. KING
Mr. CREED
Mr. OLDENBURG.

It was ordered, that Mr. HOOKE do find out a man fit to be employed by him in the service of the society, and that such an one have allowed him five pounds for a quarter of a year, to begin from the time, that Mr. HOOKE shall declare to the president, that he had taken such an one into his service.

It was agreed, that a curator, if a fit one could be met with, be entertained by the society for a quarter of a year, to begin from the Michaelmas following.

* Mr. GUNTER drew the lines on the dial in Whitehall garden, and wrote the description and use of them by the direction of Prince CHARLES, in a small tract, which he afterwards published

by order of King JAMES I. in 1624. Dr. WARD's Lives of the Professors of Gresham-college, p. 79.

Dr. WREN proposed, that some rich citizen might be found out to take a lease of Chelsea-college upon the terms of building the house, and paying some rent besides. Whereupon he was desired to inquire after such an one.

July 7. At a meeting of the SOCIETY,

Mr. HOOKE produced again his darkened box improved, so that it was now proper for the hand to draw a picture conveniently by a metalline speculum and a moveable bottom, whereby the picture appeared both erect and direct.

Mr. SMETHWICK presented an account of some experiments of the weight of some metals made by Mr. REYNOLDS in the Tower of London: Which was as follows*:

“ The weight of a square inch in decimals of the pound averdupoise.

“ Gold - - - - -	0.68057843
“ Quicksilver - - - -	0.47579412
“ Lead - - - - -	0.42288235
“ Silver - - - - -	0.37751960
“ Copper - - - - -	0.33030392
“ Tin-glass - - - - -	0.28775016
“ Forged iron - - - -	0.28610754
“ Tin - - - - -	0.27567644
“ Cast iron - - - - -	0.27215365
“ Marble - - - - -	0.10952500
“ Paving-stone - - - -	0.098
“ Freestone - - - - -	0.0935
“ Rain-water - - - - -	0.03618979
“ Lamp-oil - - - - -	0.03331
“ Sallad-oil - - - - -	0.032735
“ Fine gunpowder - - -	0.02525
“ Oak - - - - -	0.0029
“ Elm - - - - -	0.00278

“ To reduce Averdupoise into Troy weight, note, that fourteen pounds Averdupoise makes seventeen pounds Troy weight precisely.

“ The difference of some liquors upon the tun compared to rain-water.

“ Sallad-oil - - - -	21—6	} Lighter than Rain-water.
“ Claret-wine - - - -	1—6	
“ Rhenish-wine - - - -	1—4	
“ White-wine - - - -	1—2	

* Register, vol. iv. p. 100, 101.

" Canary - - - -	3	—	3	} Heavier than Rain-water.
" Sherry - - - -	5	—	3	
" Muskadin - - -	11	—	2	
" Small beer - - -	1	—	3	} Heavier than Rain-water.
" Ale - - - - -	5	—	2	
" Milk - - - - -	8	—	4	

Some experiments were made to find out the comparative weights of some metalline bodies to water.

1. A piece of lead cast, which weighed in air 3 ounces minus 2 grains or 1438 grains, in water 2 oz. 5 dr. 50 gr. or 1310 gr.

Air 1438.

Water $\frac{1310}{128}$ differ. So that the proportion of lead to water is as $10\frac{1}{8}$ to 1.

2. A piece of lead cast, weighing in air 1 oz. 0 $\frac{1}{4}$ gr. in water 7 dr. 34 gr. or 454 gr.

Air 480 $\frac{1}{4}$.

Water $\frac{454}{26\frac{1}{4}}$ differ. whereby the proportion of lead to water is as $17\frac{6}{11}$ to 1 *ferè*.

3. A piece of iron forged weighing in the air 3 oz. minus 2 gr. or 1438 gr. in water 2 oz. 5 dr. 1 gr. or 1261.

Air 1438.

Water $\frac{1261}{177}$ differ. whereby the proportion of iron to water is as $7\frac{3}{11}$ to 1.

4. A piece of iron forged weighing in the air 1 oz. in water 6 dr. 59 gr. or 419 gr.

Air 480.

Water $\frac{429}{61}$ differ. whereby the proportion of iron to water is as $6\frac{1}{4}$ to 1.

Dr. GODDARD mentioned, that he had found pure conduit water of London, as light as the same water distilled.

It was ordered, that at the next meeting should be tried silver, lead and tin, both cast and hammered; and that the pieces to be cast should be so in an open ingot and in a close mould.

July 14. The society did not sit, according to the entry in the *Journal*^s; but in the Register^s the following papers are inserted, as having been on that day produced to the society:

^s Vol. iv. p. 150.

^s Vol. iv. p. 102, *&c seq.*

1. Observations on insects lodging themselves in old willows by Dr. EDMUND KING :

2. An account of the experiments for explicating the thickening of the air by clouds and fogs, and the clearing of it in fair weather; by Mr. Hooke, which account was as follows :

“ There was made a solution of verdigrise in clear water, which was afterwards filtered through cap paper, so as to separate all such dregs and parts of the verdigrise, as were not perfectly dissolved. Of this solution about a pint was put into a clear glass-cone, which being looked through, represented the colour of a clear blue sky, and was yet further heightened in that colour by a drop or two of spirit of sal armoniac or of urine. To make then a representation of the thickening of the air, some few drops of oil of tartar per deliquium were dropt into it, and shaken together; whereupon, all the said liquor did become thick and turbid like a foggy or misty air. If it were dropt in very leisurely, and a little of it, it would appear like many little white clouds, dispersed up and down the air: if, after the liquor was thick and turbid, a little oil of vitriol or aquafortis were poured gently into it and suffered to fall to the bottom of the vessel, the liquor would begin to clear at the bottom, and the thicker and whiter parts to hang towards the top like white clouds in summer, which being suffered to stand for a while, or if the liquors so mingled were shaken together, the whole liquor would become clear and transparent almost as water; and might again be reduced to exhibit all the former phenomena, if a greater quantity of the aforesaid liquors were again poured into it.”

3. Observations on several particulars in Muscovy; communicated by Sir PETER WYCHE, which were as follow :

“ 1. Concerning the way used in Muscovy to keep their grain,

“ If they have time, servants and horses ready, as soon as the corn is reapt, they bring their corn unto a fine threshing floor, large and smooth, without any covering, near which is always a warm stove, in which they always keep fire night and day in some places, an open fire, so that both heat and smoke ascend to the place where the corn is orderly laid, the ears of corn being placed lowermost, from above towards the fire; the distance between the fire and corn is about two English yards and a half. The corn receives a very great heat; no man, I think, can endure to lie in the corn's place a quarter of an hour. After two or three days (for they have servants lie aside the fire, or sometimes the oven unstop) when they think it is dried, they bring it to the threshing floor, where one Russe shall thrash out more corn in a day, than five English men, every blow easing the sheaf of its load of corn. This corn they put into a dry house to keep it from wet weather. When they are afraid of an enemy, they will dig

* Register, vol. iv. p. 105. This paper is printed in the Philosoph. Transact. vol. v. n^o 65. p. 1038, for November 1670.

* Register, *ubi sup* a, p. 102. *Ibid.* p. 103.

" a hole in the earth, according to the proportion of corn they have to hide,
" putting chaff underneath, and on the top; and then without any more ado they
" cover it with earth, and after this sort they have kept it, as they say, from da-
" mage very many months: in a dry room they will keep it thus ordered seven
" years.

" 2. Concerning birds and beasts changing colour.

" That hares do so is very certain, and one of our common observations. I
" have been informed, that the bird called the heath-cock doth so also. I have
" procured a couple of hares, which Sir PETER WYCHE will take care to
" convey into England. These two tame hares are now beginning to change,
" the tips of their feet are white already: the day we write this is the 24th of
" Sept. 1669.

" 3. The frost pierceth two arshines into the ground, as I have been informed
" by the grave-makers, who usually thaw the outside of the ground, and dig and
" beat out the rest with spades and mattocks: it is a most terrible labour, and they
" are well paid for it. An arshine is about one third less than an English yard.
" Ice in the river I have seen an arshine and an half thick: both ice and earth are
" covered all the winter with a deep snow.

" 4. Sheep and divers calves I have seen cleft into pieces with a cleaver or pole-
" ax: they are within, as well as without, hard as oak in a manner. I have caused
" the heart to be cut out, and afterwards hewed in pieces; it is a great deal harder
" to cut than to cleave a piece of birch. It is all ice, and stiff: after it hath lain
" in a stove half an hour, the blood will distil drop by drop.

" 5. Oil never comes to be hard ice, though its fluidity is stopt: it requires
" warmth to make it run out of the bottle, and melts by degrees, but it is al-
" ways soft.

" 6. The blood of man, all ferosity severed, will freeze: any beasts blood also,
" and will be perfect ice.

" 7. Canary wines freeze also, beginning from the circumference toward the cen-
" ter, where the most spirituous substance of the wine retreats and lurks in an oval
" form of ice. The like in strong beer, which the great boyares lay up in bottles,
" to inebriate and intoxicate some persons, they have a design upon.

" 8. Thick pieces of iron and steel will become brittle; pieces of steel are very
" brittle in an extreme cold, like glass; as I am informed by smiths, &c. One
" Mr. LAYTON, that lived in coming out of the cold into a warm stove,
" struck upon some occasion, a gentle blow upon a table, and immediately his
" sword brake. We have one in our company, an ingenious fellow, that saw
" this.

" 9. Wet

" 9. Wet your finger, and clap it on a piece of iron without doors, in an ordinary cold, it shall immediately stick so fast to your finger like solder, that, if you put it away, the iron will pull off your skin.

" 10. All silver vessels, though never so old, as bowls, beakers, silver-heads of sticks, being exposed one hour to an intense cold, change colour."

July 21. There was presented Dr. WALLIS's second part of his treatise, intitled *Mechanica sive de motu tractatus geometricus: Pars secunda, in qua de Centro Gravitatis ejusque Calculo*, printed at London, in 1670, in 4^{to}.

Mr. OLDENBURG presented an Italian tract of Signor MENGOLI, intitled *Degli Refrattioni et Parallasse Solari*.

He communicated a letter to him from Mr. HEVELIUS, dated at Dantzick, July 5, 1670, N. S. *, relating to his observations of the present declination of the magnetic needle in that city made by himself June 22, 1670, N. S. whereby the needle was found there to decline from the north 7 degrees 20 minutes westward; whereas in 1642, it had declined there but 3 degrees 5 minutes westward.

Mr. HOOKE was put in mind to prosecute the observation of the meridian at Whitehall, together with Sir ROBERT MORAY.

Mr. OLDENBURG read a letter to him from Dr. WITTIE, dated at York July 4, 1670 *, concerning some experiments of his about the Scarborough Spa, which was accompanied with some curiosities sent by the Doctor, as a black sediment falling to the bottom upon the change of the water with galls, and the same powder calcined; a piece of earth taken by him from an iron stone; as also a little nitre of that Spa water.

The experiments of weighing copper and silver were referred to the next meeting; as also the examination of Mr. HOOKE's instrument for taking angles.

July 26. At a meeting of the COUNCIL were present

The President

Mr. CHARLES HOWARD
Sir ROBERT MORAY
Dr. WREN
Dr. BALLE

Mr. LOCKE
Mr. COLWALL
Mr. OLDENBURG.

Mr. LOCKE was sworn of the council.

Mr. MOSES PITT, the printer of Dr. WALLIS's two volumes *de motu* having

* Letter-Book, vol. iv. p. 31.

* Ibid. p. 27.

represented

represented to the council both the charges of printing those books, and the length of time for selling off the edition, insisted upon the price of fifteen shillings and six pence for both the volumes. Wheupon the council declared, that since he did not think fit to abate any thing of that price, and to take fourteen shillings for both the volumes, he was at liberty to sell them as he could; but that then the subscribers, who had agreed to pay such a rate, as should be set by the council, were also left at liberty to buy or not buy at his rate.

Dr. WREN was put in mind of his promise to endeavour to procure a good tenant for Chelsea-college.

July 28. At a meeting of the SOCIETY,

There was examined an instrument invented by Mr. HOOKE for measuring the distances of celestial bodies by taking angles, conceived to be of great use at night. It was so contrived, that two objects meeting at the point of a pin were seen at once, one direct, upon one arm of the instrument furnished with a telescope, the other by reflection, on the other arm, sliding upon a ruler, divided into equal parts.

It was ordered, that an instrument of this kind be made to be sent to sea.

Dr. CROWE presented from the earl of AYLESBURY some salt extracted from the waters of Bourbon, which salt was found to have nothing of a vitriolic taste, but only a lixivial one.

He again acquainted the society⁷, that Sir NICHOLAS MILLET of Battersea had a manuscript containing observations of a magnetic needle for many years, which he thought Sir NICHOLAS would not be unwilling to let the society have the perusal of, if applied to; for which reason the Doctor was desired to procure that favour from Sir NICHOLAS, and to peruse the manuscript together with Mr. HOOKE, and to make a report of it to the society.

Sir ROBERT MORAY and Mr. HOOKE were desired to observe the present variation of the needle in Whitehall-garden, during the discontinuance of the society's meetings.

Mr. HOOKE reported to the society, that he had already found so much, as to suspect some parallax of the earth's orb, and conceived, that it would be more sensible half a year after. He said, that by a perpendicular tube he observed the stars, which pass our zenith, at different times of the year, and by noting, whether the same star be at those different times of observation at the same distance from the zenith or not; concerning which he affirmed, that a certain star was then less distant from the zenith than it had been a month before.

⁷ See above May 26, 1670.

He was desired to prosecute carefully this observation, so important to determine the controversy concerning the motion of the earth.

The society thinking proper to discontinue their public weekly meetings, there was recommended to Mr. Hooke during this recess the care of these three things, 1. To continue to observe, whether there be a parallax in the earth's orb. 2. To observe the present variation of the needle. 3. To measure the precise quantity of a degree upon the earth.

October 27. The society opening this day their assemblies again,

There were presented to them, 1. from Mr. BOYLE a new book, intituled, *Treatises about the cosmical qualities of things; cosmical suspensions; the temperature of the subterranean regions; the temperature of the submarine regions, and the bottom of the sea*, printed at Oxford in 1670, in 8°. 2. From Mr. WINTHROP of New England, three boxes filled with curiosities of that country, specified in a letter of his to Mr. OLDENBURG, dated at Boston Aug. 26, 1670^c.

There was also read a Latin letter to the society from Signor GEMINIANI MONTANARI; dated at Bologna 30 April 1670, N. S.^a, expressing the singular esteem, which he had of their institution; containing some new observations lately made by him of the non-appearance of some stars of the second magnitude in the ship, though formerly observed by BAYER and others; and intimating, that he had sent them a manuscript of his own composing, containing various experiments on the breaking of the glass drops, together with his conjecture about the cause of that phenomenon, a task imposed on him by the grand duke of Tuscany, the performance of which was now presented to the society; adding likewise a present of some books, which Mr. OLDENBURG promised to produce at the next meeting.

It was ordered, that Signor MONTANARI should have the solemn thanks of the society from the secretary^b; and that his letter be entered in the Letter-book, and his discourse about the glass-drops preserved likewise, after it had been perused, and an account given of the contents of it; for which purpose were named Sir SAMUEL Tuke and Mr. Hoskyns, who divided those papers between them, and proposed to translate them into English.

Mr. OLDENBURG produced another Latin letter from ERASMUS BARTHOLINUS, M. D. dated at Copenhagen 27 February 1670^c, but not received till 8 August, (having been detained long at Hamburg) giving notice of a certain transparent stone, a kind of selenites, sent out of Iceland to Dr. BARTHOLINUS, and having in different positions a double, quadruple, and sextupline refraction; as also an electric virtue. A specimen of this stone was sent with this letter, as also a printed book composed by Dr. BARTHOLINUS; which with the said stone was re-

^a Letter-Book, vol. iv. p. 53.

^b Ibid. p. 13.

^c His letter dated at London, 19 Nov. 1670, is entered in the Letter-Book, vol. iv. p. 118.

^d Ibid. p. 9. It is printed in the Philof. Transact. vol. v. n° 67. p. 2039, for January 1672.

ferred to Mr. Hooke, who was desired to give an account of them at the next meeting.

Mr. OLDENBURG communicated also a letter in French dated at Paris 29 Oct. 1670, N. S. ^a, signifying, that at Montpellier there had been lately discovered and shewn by a German the vessels, that carry the milk to the breasts of nursing women, and that it issues out of the ductus of Monsr. PECQUET: And that an experiment had been lately made of tying close the ureters of a dog, so that no urine nor any thing else could pass; and yet that the urinary bladder had been found filled with water. Which was an argument, that confirmed the conjecture, that there is another passage of the urine to the bladder beside that by the ureters.

Two letters of Mr. WILLUGHBY to Mr. OLDENBURG were read, one dated at Aistrop 19 August 1670^a, the other at Middleton 2 Sept. 1670^b, both confirming Dr. KING's observation about the maggots lodged in old willows, and changed into bees, and sending some of the very rose leaves, out of which the bee had bitten pieces of such a shape, as are found employed by that insect in making up those carriages, wherein the bees close themselves up.

Mr. OLDENBURG read likewise two other letters, to himself, the one from Mr. HEVELIUS, dated 27 Aug. 1670, N. S. ^a, containing two observations of his concerning a new star near the *rostrum cygni*, and the present appearance of Saturn: The other from Monsr. HUYGENS dated at the Hague, 31 Oct. 1670, N. S. ^b, containing his observation of Saturn agreeing with those of Mr. HEVELIUS and Mr. Hooke, the latter of whom produced his also made in September preceding. This letter contained likewise Monsr. HUYGENS's sentiments upon Dr. WALLIS's book de *Motu*, Dr. BARROW's Optics, and Mr. BOYLE's experiments concerning respiration.

Mr. Hooke promised to produce at the next meeting a new watch-work, which should be equivalent to a pendulum.

He was put in mind to finish at last the mensuration of the quantity of a degree upon the earth; and he promised, that in the first frost and clear weather he would observe the latitudes of the places in reference to that business.

November 2. There were delivered to Mr. Hooke, for the library of the society, nine books sent by Signor MONTANARI; and the rest were promised by the secretary to be produced at the next meeting: These nine books were,

1. *Exercitationes mechanicae* MARCHETTI.

2, 3, 4, 5. *Quatre Considerationi del ANGELI contra RICCIOLI*, in 4 volumes.

^a It is printed in the *Philos. Transact.* vol. v. n^o 65, p. 2083, for November 1670.

^b Letter-Book, vol. iv. p. 46.

^c *Ibid.* p. 67. Extracts of these two letters are printed in the *Philos. Transact.* n^o 65, p. 2100.

^d Letter-Book, vol. iv. p. 57. It is printed in the *Philos. Transact.* n^o 65, p. 2087.

^e Letter-Book, p. 100. See *Philos. Transact.* n^o 65, p. 2093.

6. *De Ottone Aereo Commentarii* JOHANNIS CAPONI.
7. *Proſaſi Phyſico-matematicæ* del FINETTI.
8. *Argomento Phyſico-matem.* del P. RICCIOLI, con la riſpoſta del P. ANGELI.
9. *Apologia del Padre RICCIOLI contra ſiſtema Copernicanum.*

DANIEL GEORGE MORHOFF, Profeſſor in the Univerſity of Kiel in Holſtein, preſented the ſociety with an account of an experiment, which he affirmed to have ſeen performed at Amſterdam, of breaking a Rheniſh wine-glaſs with a ſonorous human voice, anſwering the tone of the glaſs, when knocked, and an octave being taken above it. This account was dated at London Novemb. 3, 1670, and addreſſed to Mr. OLDENBURG. This experiment was ordered to be tried.

MR. OLDENBURG read a Latin letter to him from Mr. GEORGE SPIERNHELM, dated at Stockholm 17 May 1670⁴, acknowledging the ſociety's favour in electing him a member of their body, and communicating a ſtrange ſtory of a gardiner of the Queen of Sweden, who in the year 1636 endeavouring to aſſiſt a perſon in danger of being drowned, broke the ice himſelf, and falling under it at fix in the evening, continued in that ſituation till nine the next morning, when he was taken out without the leaſt ſign of life in him; but being carried into a warm ſtove, and put to bed, after an hour or two, having vomited ſome water, began to breathe, and in a few days recovered intirely, except a deafneſs in one ear, which continued, when this letter was written, he being then alive at ſixty four years of age, and the fact well known to the whole court.

November 10. At a meeting of the COUNCIL were preſent

The Preſident

The lord HENRY HOWARD
The lord biſhop of CHESTER
Sir PAUL NEILE
Mr. COLWALL

Dr. SMITH
Dr. KING
Mr. HOSKYNs
Mr. OLDENBURG.

Five of the council were named to be a committee for auditing the treaſurer's accounts, viz. the preſident, the lord HENRY HOWARD, the lord biſhop of CHESTER, Dr. SMITH, and one of the ſecretaries.

It was reſolved, that there be drawn up a legal form, by which every perſon, who deſired to continue a fellow of the Royal Society, and ſhould ſign the ſame, ſhould oblige himſelf to pay his arrears of fifty two ſhillings a year, and four pounds *per annua* for the future: Which obligation ſhould however bind none of the ſubſcribers, unleſs the number be ſuch, whoſe contributions the council ſhould judge ſufficient to deſray the charges requiſite to carry on the buſineſs of the ſociety: And

⁴ Letter-Book, vol. iv. p. 108. MORHOFF *ſcripſit vitæque per ſonum humane vocis 11710.*
published at Kiel in 1072, in 4^{to}, *Eſſays de*

⁵ Letter-Book, vol. iv. p. 20.

That Mr. HOSKYNs be desired to draw up such a form against the next meeting of the council to be held on the 14th of that month at the president's house in Covent-Garden.

Mr. HOSKYNs was accordingly desired to draw up such a form, which he promised to do.

N^o 65 of the *Philosophical Transactions* was licensed.

At a meeting of the SOCIETY, on the same day,

The rest of the books presented to the society by Signor MONTANARI were delivered to Mr. HOOKE for the repository, viz.

1. *Antignome Physico-matematiche del D. DONATO ROSETTI.*
2. *Insegnamenti fisico-matematiche dati al GINETTI.*
3. *Congiecture fisico-astronomiche della Natura del universo, da PIETRO CAVINA.*
4. *Dimostrazione fisico-matematiche delle sette propositi che promette DONATO ROSETTI.*
5. *Lettere del Signor MONTANARI, et Risposte del Signor ROSETTI.*

Mr. HOOKE produced an essay of a new watch-work, which he said might be made into a pocket-watch, and would go equally in all positions and motions at sea: Which he was desired to perfect, if he could, against the next meeting.

Mr. OLDENBURG read a letter written by Dr. DURSTON of Plymouth to Dr. TIMOTHY CLARKE, dated 28 Octob. 1670, containing an account of a monstrous birth at Plymouth, with some anatomical observations thereupon¹.

He communicated likewise a letter to himself from Mr. ADAM MARTINDALE² dated at Rotherlon in Cheshire 4 Novemb. 1670, giving an account of a rock of natural salt, lately discovered in that county, and yielding a vigorous sharp brine beyond any of the springs in the salt-works of Cheshire³.

It was ordered, that Mr. MARTINDALE should be thanked in the name of the society⁴, and desired to view the place himself, if he could conveniently; and then acquaint them with the most considerable particulars of this matter.

¹ Letter-Book, vol. iv. p. 95. It is printed in the Philos. Transact. vol. v. n^o 65, p. 2095, for Novemb. 1670.

² He had been ejected from the living of Rotherlon in Cheshire, for non-conformity in 1662. I have in my possession a manuscript in his hand-writing relating to his own life.

³ This letter is entered in the Letter-Book, vol. iv. p. 114, and printed in the Philos. Transact. vol. v. n^o 16, p. 2015, for Decemb. 1670.

⁴ Mr. OLDENBURG's letter to him for that purpose was dated Nov. 15, 1670, and inserted in the Letter-Book, vol. iv. p. 115.

Mr. HOOKE mentioned a little book lately translated into English out of French, and printed at London 1670 in 12°. under the title of *A Discourse about local Motion*, undertaking to demonstrate the rules of motion, and to prove, that of the seven rules given by DES CARTES on that subject, there is but one true. He intimated, that he intended to make some experiments in order to try the truth of the author's observations, and to shew them to the society.

Nov. 14. At a meeting of the COUNCIL were present

The President

The earl of AYLESBURY
The lord HOWARD
The lord bishop of CHESTER
Sir ROBERT MORAY
Sir PAUL NEILE

Mr CHARLES HOWARD
Dr. GODDARD
Mr. COLWALL
Dr. KING
Mr. OLDENBURG.

It was resolved, that Mr. HOOKE be summoned to attend the next meeting of the council, to receive their rebuke for the neglect of his office.

Mr. HOSKYNs produced the legal form of subscriptions, which had been recommended by him at the last meeting of the council; which form was read, and referred to the consideration of another meeting. It was as follows:

"I — do covenant, grant, and agree to and with the president, council and fellows of the Royal Society, &c. to pay unto them the sum of — upon the — day of — which shall be in the year of our Lord —. And also the sum of four pounds yearly and every year, so long as I shall continue fellow of the said society, by four even quarterly payments, the first to be on —. To the performance of which I do hereby bind myself and my heirs. Witnests my hand and seal this — day of —. In the presence of —."

Or thus:

"We, whose names are under-written, do every one for himself and not for another covenant, promise, grant and agree to and with the president — &c. to pay all and every such sum and sums of money, as each of us respectively owe and are due unto the said society from us by virtue of any order or statute of the said society: and also the yearly sum of four pounds by four equal quarterly payments at the four usual days of payment in the year, that is to say — The said payment to continue so long as each of us respectively do continue a member of the said society. To all which several payments we do severally and respectively bind ourselves, our several and respective heirs.

"Sealed and delivered by
— the — day of —
in the presence of —."

Nov. 17. At a meeting of the SOCIETY,

Mr. HOOKE produced another watch-work performing the effect of a pendulum; but he acknowledged it not so valuable as what he had shewed at the last meeting; which therefore he was desired to prosecute and perfect.

Mr. OLDENBURG read a letter from Mr. HEVELIUS, dated at Dantzick Oct. 31, 1670¹, containing some of his late observations, 1. of the last eclipse of the moon on Sept. 29, 1670, N. S. 2. of the late conjunction of Venus and the moon on the 11th of October 1670, N. S. and 3. of the considerable decrease of the new star lately discovered about the beak of *Orion*, and some remarks on the other new star in the neck of the whale.

Mr. HOOKE being asked, whether he had tried the experiment of breaking a glass with an human voice, said, that he had tried it, but found no other success, than that the glass had sounded upon the sound of a man's voice.

He was desired to try it again, and to take care of finding the tone of an octave requisite for the effect; and that being found, to continue it for a while forcibly and without interruption.

Nov. 24. At a meeting of the COUNCIL were present

The President

The lord HOWARD
Mr. CHARLES HOWARD
Sir ROBERT MORAY
Mr. HENSHAW

Dr. GODDARD
Mr. COLWALL
Mr. HOSKYNES
Mr. OLDENBURG.

The committee of the council for auditing the accounts made their report, which the council approved of, viz.

" At a committee of the council of the Royal Society for auditing the treasurer's accounts,

" Upon examination of Mr. DANIEL COLWALL's accounts we find him debtor

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" To the arrears due to the said society for their quarterly payments, this 10th Nov. 1670.	1475	11	0
" To monies he hath received for admissions	10	10	0
" To the balance of his last account	70	12	8
	<u>1556</u>	<u>13</u>	<u>8</u>

" He is creditor

¹ Letter-Book, vol. iv. p. 102. It is printed in the Philos. Transac. vol. v. n^o 66. p. 203. for December 1670.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
" By money he hath paid for the use of the society —	220	15	10
" By arrears yet unpaid by the fellows of the society —	1267	2	0
" By balance resting in his hand, sixty eight pounds, fifteen } " shillings, ten pence —	68	15	10
	<u>1567</u>	<u>14</u>	<u>8</u>

At a meeting of the SOCIETY on the same day,

There was chosen a committee for auditing the accounts, viz.

Sir PETER WYCHE,
Sir SAMUEL TUKE,
Dr. TIMOTHY CLARKE,

Dr. EDWARD BROWN,
Mr. LE HUNT.

Which committee, or any three of them, were to meet on the following Wednesday Nov. 30, in the morning between eight and nine of the clock.

There was read a letter from Dr. WALLIS to Mr. OLDENBURG, dated at Oxford Nov. 15, 1670*, concerning a controversy between HONORATO FABRI and JOHN BAPTISTA BORELLI; whether a stone thrown horizontally will in the same time come to the horizontal plane, as if without the motion of projection it had fallen directly down in the perpendicular. This FABRI denied, alledging an experiment of MERSENNUS to that purpose, and affirming the motion of descent to be retarded by the additional horizontal motion, supposing the descent in the curve to be by the obliquity of the motion hindered, as in sloping planes.

Dr. WALLIS desired, that an experiment formerly suggested by him to the society might be made for the clearing this matter; for though, he supposed, most of the members were rather of BORELLI's than FABRI's opinion, yet, as it was denied, he thought it well deserved to be tried. The consideration of this was referred to the next meeting.

There was read another letter written from Derby Nov. 16, 1670, by Mr. JOHN FLAMSTEAD to Mr. OLDENBURG†, accompanied with a Latin manuscript containing a description made by him of the celestial appearances of the next year by him predicted and recommended to observation.

It was ordered, that he should be thanked, and the sum of his papers be printed in the *Philosophical Transactions* of the following month‡.

Mr. HOOKE being absent from this meeting, no experiments were provided.

* Letter-Book, vol. iv. p. 175.

† Ibid.

‡ It was accordingly printed, n° 66.

Nov. 30. Mr. AUBREY presented the society with an old printed book in the ancient British tongue.

The committee for auditing the accounts brought in their report concerning the same, viz.

" At a committee of the Royal Society for auditing the treasurer's account,
" Nov. 30, 1670,

" We certify, that it appears,

	l.	s.	d.
" That the treasurer had received on the quarterly payments	208	9	0

" That he hath received more for admissions	—	10	10	0
---	---	----	----	---

" That he is debtor to the balance of his last account ending	}	70	12	8
" Nov. 12, 1669.	—	—	—	—
		<u>289</u>	<u>11</u>	<u>8</u>

" PETER WYCHE,
" EDWARD BROWN,
" WILLIAM LE HUNT."

" That it also appears,

" That he hath paid to the use of the society, as by bills and	}	210	15	10
" orders of the council	—	—	—	—

" That he hath resting in cash now in his hand sixty eight	}	68	15	10
" pounds, fifteen shillings, ten pence	—	—	—	—
		<u>289</u>	<u>11</u>	<u>8</u>

" PETER WYCHE,
" EDWARD BROWN,
" WILLIAM LE HUNT."

This being the anniversary day for electing the council and officers of the society for the year following, there were continued of the old council,

The lord viscount Brouncker
The earl of AYLESBURY
The lord bishop of SARUM
The lord bishop of CHESTER
The lord HENRY HOWARD
SIR ROBERT MORAY

SIR PAUL NEILE
DR. GODDARD
MR. HENSHAW
MR. COLWALL
MR. OLDENBURG.

The ten new members of the COUNCIL elected were,

Sir

Sir JOHN LOWTHER
 Sir PETER WYCHE
 Sir JOHN BANKES
 Sir SAMUEL TUKE
 Sir JAMES HAYES

Mr. AERSKINE
 Mr. EVELYN
 Dr. TIMOTHY CLARKE
 Dr. CROUNE
 Dr. EDWARD BROWN.

Of these new ones were sworn,

Mr. AERSKINE
 Sir PETER WYCHE
 Sir JOHN BANKES
 Sir SAMUEL TUKE

Sir JAMES HAYES
 Mr. EVELYN
 Dr. CROUNE
 Dr. BROWN.

The officers chosen were,

The lord viscount BOUNCKER, president.

Mr. COLWALL, treasurer.

Mr. HENSHAW, } secretaries.
 Mr. OLDENBURG, }

The society lost by death between this and the former election three eminent members, Monfr. SORBIERE, EDWARD WATERHOUSE, LL. D. and WILLIAM NEILE, esq;

SAMUEL SORBIERE was descended of a good family, and born at St. Ambroix in the diocese of Uzez in the province of Languedoc in France, on the 17th of September 1615, according to the account of his only son: but if the inscription on the print of him engraved after his death from that done by AUDRAN at Rome in 1667, is to be depended upon, he must have been born five years sooner, in 1610¹. His parents were both Protestants; his father STEPHEN SORBIERE being a citizen of St. Ambroix, and his mother LOUISE PETIT sister of SAMUEL PETIT, minister of the Reformed Church at Nismes, well known to the learned world by his writings. Monfr. SORBIERE's parents dying when he was very young, Monfr. PETIT, who was his god-father as well as uncle, took him into his own house, and had as much care of his education, as if he had been his own son. After Monfr. SORBIERE had been initiated in polite learning under so great a master of it, he went in 1639 to Paris, where, having conceived a dislike to the study of divinity, to which he had been designed, he applied himself to that of physic, in which he made so considerable a progress, that in a short time he drew up a system of that art for his own use, which was printed in a large sheet of paper, under the title of *Système de la Médecine Galénique pour le soulagement de la Mémoire*.

¹ Mémoires pour la vie de Monfr. SORBIERE par Monfr. GRAVEROL, prefixed to Sorberians, edit. d' Amsterdam 1694.

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After residing near four years at Paris, where he was admitted into the acquaintance and friendship of the men of the greatest eminence for learning*, particularly GROTIUS, father MERSENNUS, and GASSENDUS, he went to Holland, where in the beginning of the year 1642 he paid a visit to Monfr. DES CARTES then residing at Eyndegeest near Leyden†; and the year following he published under the disguised name of GUTHBERTUS HIGLANDUS a letter addressed to Dr. ANDREW RIVET in answer to the *Crurifragium Prodrumi Rivetiani* of Monfr. DE LA MILETIERE; which letter is subjoined to Dr. RIVET's Apologetic against GROTIUS. During his stay in Holland he assisted in the translation of CAMDEN's *Britannia*, designed for a part of the Great Atlas, which translation had been begun by a priest named SALABERT, who could not continue it, being obliged to return to France. Monfr. SORBIERE translated likewise into French Sir THOMAS MORE's *Utopia*, at the desire of the count DE RHINGRAVE, governor of Sluys, which translation was printed at Amsterdam in 1643 in 12°.

The necessity of his circumstances rendering it proper for him to return to his own country, but being unable to support the charges of the journey, he requested his learned friend GASPAR BARLÆUS, professor of philosophy at Amsterdam, in a letter of June 13, 1644‡, to recommend him to attend the son of some rich man into France in the autumn or spring following: and he found some means of going thither in 1645, but went back to Holland the year following, and married soon after at the Hague JUDITH RENAUD, daughter of DANIEL RENAUD, who was a native of St. Ambroix, as well as himself. About this time having formed a design of settling in some place for the practice of physic, he fixed upon Leyden for that purpose, where in 1648 in 12° he published his *Discours sceptique sur le passage du chyle et sur le mouvement de cœur*. The year following he published at Amsterdam in 8vo a French translation of Mr. THOMAS HOBBS's *Elementa Philosophica seu politica de cive*, of which he had in 1647 published an edition at Amsterdam, at the request of GASSENDUS and father MERSENNUS. He accompanied his translation with an apologetical discourse prefixed to it. His *Lettre d'un marchand du Bresil à un de ses amis d'Amsterdam* was written by him in favour of the Dutch East-India company, for the satisfaction of his father-in-law, who had some interest in that company.

His unsettled temper having induced him to return to France, he was made principal of the college in the city of Orange in 1650; where, to gratify count DE DHONA, the governor, he published a piece intitled, *Lettre d'un Gentilhomme François à un de ses amis d'Amsterdam sur les desseins de CROMWELL*. At the end of the year 1653 he went to Vaifon, where he abjured the Reformed, and embraced the Roman Catholic religion, by the persuasion of JOSEPH MARIE SUARES, bishop of that city, whose name he assumed at his confirmation. In the beginning of 1654 he made a journey to Paris, and published there a discourse on the change of his religion dedicated to cardinal MAZARIN: and the clergy having granted

* Monfr. SORBIERE's letter to GASPAR BARLÆUS, dated at the Hague 14. Jun. 1644. printed in *Clavrum Virorum Epistolarum centum indicibus* mss. JOH. BRANT, edit. Amstel. 1702. in 8vo.

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p. 186.

† Lettres et Discours de M. DE SORBIERE, p. 679.

‡ *Clavrum Virorum Epistolæ, ubi supra.*

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him a pension of 400 livres, he took the clerical habit in view of a benefice, which the cardinal gave him hopes of, having in the mean time conferred on him a pension of 300 livres*. From Paris he went to Rome*, where he made himself known to Pope ALEXANDER VII. by a Latin letter, addressed to him, and written against the Protestants, who were angry with him for abandoning them. Upon his return to Paris he published under the name of *Sebastianus Aetophilus* a Latin letter against RIOLANUS upon the lacteal veins discovered by GASPARELLIUS of Cremona, a celebrated anatomist at Padua. It was addressed to JOHN PECQUET, in whose *Experimenta Anatomica*, printed at Paris 1654 in 4to, it is inserted. He published likewise under the same name in 1657 another Latin letter *ad Lignerium de vitandâ in scribendo acerbitate*. The year following his *Dispositio de vitâ et moribus PETRI GASSENDI* was prefixed to the edition of the works of that philosopher printed at Lyons in six volumes in folio. In 1660 he published at Paris in 4to his *Lettres et Discours sur diverses matieres curieuses*, which contain several discourses read by him at the assembly at Monsr. DE MONTMOR's, which began their meetings on the 18th of December 1657, and in which Monsr. SORBIERE acted as secretary. He was honoured in 1660 with the title of historiographer to the French king, who gave him some months after a pension of a thousand livres on the abbey of Horublières in the diocese of Noyon, and two years after another pension of the same value; besides which he had two other pensions of 150 and 136 livres given him in 1656 by Pope ALEXANDER VII. together with the priory of St. Nicholas de la Guierche in the diocese of Rennes, worth 500 livres a year, conferred on him by that Pope, and the chapel of Notre Dame la Gifante of the same value, and a pension of 800 livres from the clergy*.

In 1663 he made a tour into England, where on the 22d of June he was elected into the Royal Society; and the year following published at Paris in 12° an account of his journey under the title of *Relation d'un voyage en Angleterre, ou sont touchées plusieurs choses, qui regardent l'estat des sciences et de la religion, et autres matieres curieuses*. This book gave such offence, that the French king in his council held at Fontainebleau July 9, 1664, N. S. being informed, that the author had taken the liberty to assert several things, which were false and injurious to the English nation, and to the character of one of the chief ministers of state* of that kingdom, for whom that king had a high affection, esteem, and regard; and that he had likewise cast several groundless reflections on the conduct of the king of Denmark with respect to count ULEFELDT; his Majesty being desirous of shewing public marks of his displeasure against this audacious and impudent satire, ordered it to be suppressed*, having some time before punished the author by banishing him to Nantes. Under this disgrace M. DE SORBIERE wrote a Latin letter to the bishop of Laon, requesting him to use his interest with the lord AUBIGNY, that the latter would prevail upon King CHARLES II. to interpose with LEWIS XIV.

* GRAVEROL, *ubi supra*.

* He was there in March and May 1654, as appears from two of his letters printed in his *Lettres et Discours*, p. 321 and 325.

† GRAVEROL, *ubi supra*.

* The earl of CLARENDON.

* Extract of the registers of the council held at Fontainebleau July 9, 1664, among the papers of the Royal Society.

for the recalling Monfr. SORBIERE from his exile; who in this letter as highly extolled the earl of CLARENDON, as he had in his *Relation* depressed him*. That book, which soon met with a severe censure from Mr. THOMAS SPRAT in his *Observations* addressed to Dr. CHRISTOPHER WREN, and published in 1665, was probably the occasion, that the council of the Royal Society on the 14th of Nov. 1666 proposed it to the Society, to leave him out of the list of their members; but the question was carried on the ballot in his favour by fourteen votes against eight.

Pope ALEXANDER VII. dying in 1667, Monfr. SORBIERE published a large collection of poems in various languages in honour of cardinal ROSPGLIOSI, who was thought likely to succeed to the papal see, and with whom he had kept a correspondence by letters ever since his journey to Rome in 1654; whither he returned in 1667, in order to be present at the advancement of that cardinal to the papedom, upon which event he wrote a letter to Monfr. DE MONTMOR, in which he gave the character of the new Pope under the title of CLEMENTIS IX. *Icon*. During his residence at Rome he published his discourse on the transfusion of the blood of an animal into the human body.

His expectations from CLEMENT IX. were extremely disappointed; for though he was well received by him, he had from him only a present of an hundred pistoles to bear the charges of his journey, and some benefices in Bretagne, which being attended with law-suits were of little profit to him. He returned therefore in some chagrin to Paris, where he printed in 1669 a collection of letters, under the title of *Epistolæ illustrium et eruditiorum virorum*, inserting among them all those, which he had received from the Pope, when cardinal ROSPGLIOSI, in order to insinuate, that he had not undertaken his last journey to Rome upon chimerical hopes.

He died April 9, 1670, N. S. after three months sickness of a dropsy; when finding his case desperate he took four grains of laudanum, in order to soften the horrors, and lessen the agonies of death†.

His parts were not contemptible, but his knowledge in ancient and modern philosophy was merely superficial‡. His chief ambition and employment was to be acquainted with the men eminent for learning throughout Europe, and to profit more by their conversation than by books, so that he had the reputation of being rather curious than learned§. He was a great master of RABELAIS, and particularly fond of MONTAGNE and CHARRON, and had so high an esteem for CRELLIUS the Socinian, that some years before his death he began a translation of that writer's treatise of *Causis Mortis CHRISTI*¶, which he stiled an ineffimable piece, as he did CRELLIUS a *faisiful servant of God*||.

* Letter of Mr. OLDENBURG to Mr. BOYLE, dated at London Oct. 20, 1664, printed in Mr. BOYLE'S works, vol. v. p. 313.

† GRAVEVOL.

‡ CHAPLAIN, *Memoire de quelques gens de lettres vivans* in 1662, dressé par ordre de Monfr.

COLBERT, printed at the end of *Mélanges de littérature tirés des lettres manuscrites de Monfr. CHAPLAIN*, Paris 1716.

§ BAILLET VIE DE DES CARTES, tom. ii. p. 167.

¶ GRAVEVOL, *ubi supra*.

|| SORBIERIANA, p. 54.

EDWARD WATERHOUSE, LL.D. had a learned education, and resided some time at Oxford for the sake of the Bodleian library there, but does not appear to have been a member of that university *. In 1653, he published at London in 8°, *An Apology for Learning and Learned Men*, and another discourse in the same form *Of magnanimity under Crosses, and of acquaintance with God*. His next piece printed at London in 12°, was intitled, *Of the Piety, Charity, and Policy of older Times, paralleled by members of the Church of England*. His *Discourse and Defence of Arms and Armory, shewing the Nature and Rise of Arms and Honour in England, from the Camp, the Court, and the City, under the two latter of which are contained the Universities and Inns of Courts*, was printed at London 1660, 8°. Soon after the passing of the second charter of the Royal Society he was proposed on the 22d of July 1663, candidate for election into it, and chosen on the 29th of that month, being admitted on the 5th of August. The same year he published a *Commentary on Sir JOHN FORTESCUE de Laudibus Legum Angliæ*, printed at London in fol. The fire of London in September 1666 occasioned him to give the public another piece, which seems to be his last performance, published there in 8° the year following under the title of *A Narrative of the burning of London*, anno 1666. He afterwards entered into holy orders by the persuation of Dr. SHEDDEN archbishop of Canterbury †; which appears to have been about the year 1668; for in the printed list of the Royal Society for 1668, he is styled EDWARD WATERHOUSE, esq; whereas in that of 1669, he has the title of D. D. which in a copy, that once belonged to Dr. PELL, is corrected LL. D. He died on the 30th of May 1670 ‡, at his house at Mile-end Green, leaving two young daughters behind him, and was interred June 2, at Greenford in Middlesex, where he had some estate §.

WILLIAM NEILE, esq; was eldest son of Sir PAUL NEILE, knt. one of the ushers of the privy-chamber to King CHARLES I. and was grandson of Dr. RICHARD NEILE, archbishop of York, in whose palace at Bishops-Thorp in Yorkshire he was born 7 Decemb. 1637. His education was in the university of Oxford, where he became gentleman commoner of Wadham-college in 1652, for the sake of Dr. WILKINS the warden, by whose instructions and those of Dr. SEYMUR WARD he greatly cultivated and improved his genius in mathematics †. His success in that study appeared as early as the year 1657, when he found out and demonstrated a straight line equal to a paraboloëid, and communicated and published the same (though not in print) to the lord viscount Brouncker and others, who used to meet at Gresham-college, and by whom it was received with good approbation ‡; and his demonstration of this was published with those of the lord Brouncker and Dr. WREN in Dr. WALLIS's book *de Cycloide* § printed at Oxford in 1659, in 4to.

* WOOD Fassi Oxon. vol. ii. col. 94, 95.

† Id. ibid.

‡ PECK's *Desiderata Curiosa*, vol. ii. b. 14. p. 43. Mr. WOOD is mistaken in saying, that Dr. WATERHOUSE died in 1671.

§ PECK, *ubi supra*.

* WOOD Athen. Oxon. vol. ii. col. 467.

† Lord Brouncker's letter to Mr. OLDENBURG dated at London, Oct. 8, 1673, printed in the *Philos. Transact.* vol. viii. n° 98, p. 6147, and Dr. WALLIS's and Dr. WAAN's letters ibid. p. 6146—6150.

‡ P. 93.

Mr. NEILE was an early member of the Royal Society, for being proposed a candidate on the 31st of December 1662, he was elected into it on the 7th of January following, and admitted on the 14th of that month; and at the election of officers of the society April 11, 1666, was chosen of the council. His theory of motion was communicated to the society 29 April 1669. But the farther expectations, which the public had conceived of the force of his genius in mathematical and philosophical subjects, were disappointed by his death, which happened at his father's house at White Waltham in Berkshire on the 24th of Aug. 1670, in the church of which parish he was interred.

Decemb. 8. Monfr. ANDREAS MONCEAUX, a French gentleman and a great traveller, son to Monfr. MONCEAUX, counsellor to the most Christian King, and great audiencier of France, was proposed candidate.

Mr. Hooke brought in this problem of architecture; The basis of the distance of two pillars and the altitude of an arch being given, to find out the right figure of that arch, for the firm sustaining, upon the whole, or any part of it, any weight given; as also to find out the buttments of that arch.

Mr. Hooke being asked, whether he had the demonstration of this useful problem, he said he had it, and would shew it to the president.

He was desired to represent at the next meeting the mechanical way of making such an arch by pieces of angles standing in such angles, as to make the figure of an arch required; which he promised to do.

Mr. OLDENBURG renewing the late motion of Dr. WALLIS for deciding by a just experiment the controversy between Signor BORZELLI and HONORATO FABRI, Mr. Hooke was ordered to prepare for an experiment to be made at the next meeting in the assembly-room, by having two balls, and projecting the one horizontally from the window over the door, and letting the other fall down perpendicularly from the same height.

Mr. OLDENBURG read a letter to him from Mr. MARTINDALE dated at Rotherston, Novem. 26, 1670¹, signifying, that he had himself viewed the salt-rock lately discovered in that country, and found things very nearly answering his friend's relation communicated Novem. 10.

Decemb. 15. Monfr. MONCEAUX was elected.

Sir EDWARD RICH was proposed candidate by Sir JAMES HAYES.

Mr. Hooke represented the mechanical way of making an arch of such a figure, as shall sustain any weight given. Being asked, whether he had ready the demonstration of it, he answered, that he had given it to the president, who was absent from this meeting.

¹ Letter-Book, vol. iv. p. 132. It is printed in the Philof. Transact. vol. v. n° 66, p. 2016.

The experiment of the horizontal projection and perpendicular fall of bodies was referred to the next meeting.

Mr. AUBREY presented to the society a piece of Roman antiquity, which was a pot found in Weekfield in the parish of Hedington in Wiltshire in 1656, then half full of Roman coin, silver and copper, about CONSTANTINE. In this field, he remarked, had been a Roman colony, there having been digged up many foundations of houses and much coin.

He presented likewise Dr. JOHN DAVIES's *Grammatica Linguae Cambro-Britannicae*; as also HERONIS CTESIBII ΒΙΒΛΙΟΜΑΧΙΑ, i. e. *Tetrahysteria*, in Greek and Latin, with Scholia by BERNARD BALDUS, with HERO's life written by the said BALDUS, printed Augsburg in 1616, in 4°.

Sir JAMES HAYES produced an antique stone with an Italian writing cut upon it, found in Windsor-Tower, called the Devil's tower. Mr. HENSHAW undertook to examine the writing at his leisure, and to give the society an account of it.

167?, January 12. There was presented from Mr. BOYLE some printed philosophical tracts of his, viz. *Of a Discovery of the admirable Rarefaction of the Air; new observations about the duration of the Spring of the Air*, &c. printed at London, in 4to.

Mr. HOOKE brought in a curiosity, sent to the society for the repository by the archbishop of CANTERBURY*, supposed to be several pieces of an hippotamus, digged up at Chatham, according to a printed paper accompanying the same.

Dr. FULLWOOD†, being sent by the bishop of SALISBURY to the society, presented them with a stone grown *in pene viri*, which, he said, was delivered to him by Dr. EDWARD COTTON for the society's repository, according to a letter accompanying it, dated at Exeter January 7, 167?, from Dr. COTTON to the bishop of SALISBURY‡.

Dr. COTTON in this letter observed, that upon examination of the person, who voided the stone, and upon trial of the part, he found, that about eleven years before he voided it, the stone coming from the bladder into the urethra, was then too big to pass through, and therefore stuck within two inches of the top of it; and within a few days the urine forced a passage immediately behind it, and so continued during the whole time, that the stone stuck there. The man being not much troubled with it, continued his usual exercises, and once, at least, took a journey to London without any considerable inconvenience. This stone weighed three quarters of an ounce wanting five grains *Averdupois*. It was ordered, that Dr.

* Dr. GILBERT SHELTON.

† Probably FRANCIS FULLWOOD, D.D. Minister of West Alvington in Devonshire, archdeacon

of Torneis, and canon of Exeter. Wood, Athen. Oxon. vol. ii. fol. 299.

‡ Letter-Book, vol. iv. p. 155.

COTTON should be thanked for this communication, and desired, according to his offer, to procure the testimony of the patient concerning the truth of the fact.

Sir ROBERT MCRAY mentioned, that the King had laid a wager of fifty pounds to five for the compression of air by water; and that it was acknowledged, that his Majesty had won the wager. Sir ROBERT desired, that the experiments formerly made for evincing this fact might be made before the society, and afterwards before the King; which he said might be done by a cane contrived after such a manner, that it should take in more and more water, according as it should be sunk deeper and deeper into it.

He desired likewise, that the experiment of supporting any heavy body at a certain depth under water, by keeping it from being depressed by any incumbent water, might be made.

It was ordered, that the apparatus for the first of these experiments should be made ready by Mr. HOOKE for the next meeting; and that Mr. OLDENBURG should desire Mr. BOYLE in the name of the society to lend them the apparatus for the other experiment.

Mr. HOOKE produced his engine formerly promised for grinding glasses of a true both elliptical and hyperbolical figure; whereby, he affirmed, all the motions made by this contrivance touch every point in an ellipsis.

It was ordered, that this engine should be put in a frame, and a trial made of its performance. Some of the members doubted, that this engine would wear; and the sand remain uneven, which would make the figure of the glass imperfect. But Mr. HOOKE was of opinion, that by this engine the sand would be prepared equally fine, and so spread every where.

He proposed a new way of making a vessel for extracting the air, so large, that a man might sit in it, and so contrived, as to rarefy the air to a certain degree, and to supply the person sitting in it with fresh air. He was desired to get such a vessel made.

Mr. OLDENBURG read a letter written to him from Monfr. HUET, dated at St. Germain, Octob. 30, 1670, N. S. *, and containing an account of two experiments made for finding out another passage of the urine to the bladder besides the known one; as also a confirmation of Monfr. HAUTON's invention for making sea-water sweet.

Dr. KING hereupon related, that he had also made an experiment, to find, whether there were another passage for the urine, which he had done by cutting away the ureters, and inserting a silver pipe tied about into the next part to the kidney, thereby to hinder all passage to the urine that way; but that he had found no

* Letter-Book, vol. iv. p. 98. It is printed in the Philos. Transact. vol. v. n° 67. p. 2019, for January 1671.

liquor in the bladder, except two or three drops, having in the beginning first squeezed out all the urine, and given the dog, made use of by him, a good quantity of milk to drink, and meat to eat.

The demonstration of Mr. Hooke concerning the line of an arch for supporting any weight assigned, being called for, Mr. OLDENBURG mentioned, that Dr. WREN had also a demonstration of it. It was desired, that these demonstrations might be both delivered and opened together by the president.

The experiments appointed for the next meeting were

1. That of the horizontal projection of a ball and the perpendicular descent of another, to see, whether these two balls will come to the ground in the same time.
2. The engine for elliptical glasses.
3. The air-vessel.
4. The apparatus for compressing air by water.
5. The experiment for making an heavy body swim at a certain depth under water.

January 19. The experiments for keeping an heavy body suspended at a certain depth under water was made and succeeded very well, according to the way delivered by Mr. BOYLE in his *Hydrostatical paradoxes*, propos. 11. The secretary was desired to return Mr. BOYLE the society's thanks for furnishing them with the apparatus for making this experiment.

This apparatus was recommended to the care of Sir ROBERT MORAY, in order to shew the same experiment to his Majesty.

The other experiment about the synchronism of the fall of a projected and a perpendicularly descending body was referred to the next meeting, and the operator ordered to speak for the key of the room over the door of the meeting-rooms to make the experiment in.

Mr. Hooke was called upon to make ready the apparatus necessary to shew the Link the compression of air by water; which he promised to do.

It was desired, that the same experiment might be made in a bottle, wherein the air should be so compressed, as to drive out the water.

Both methods were directed to be first represented to the society.

Mr. Hooke promised likewise, that at the next meeting he would bring in the new air-vessel; as also, if he possibly could, the new glass-grinding engine.

Dr. WREN delivered to the president his demonstration of what line it is, which an arch, fit to sustain any assigned weight, makes.

The president was desired to examine it, and to give an account of it to the society.

Mr. HOOKE being called upon for his demonstration of the same subject answered, that he had already declared the substance of it to the president, who yet desired him to give it also in writing, that so it might be with more leisure and convenience examined.

Mr. HOOKE produced from Mr. TOWNLEY a box full of a certain herb pretended to be a succedaneum of tea, and said to grow plentifully in Lancashire. Some of the members viewing it found it to be the *Myrus Brabantia*, in English, sweet willow.

Mr. OLDENBURG produced two letters written to him, the one by Mr. WRAY, from Middleton 13 January 1679*, containing an uncommon account of pismires yielding an acid spirit fit to turn a violet colour into red. The other was from Mr. MARTIN LISTER, dated at York January 10, 1679*, containing a catalogue of thirty three several sorts of spiders to be found in England, and by him reduced into several classes; together with a set of queries on that subject, in order to the composing a philosophical history of it.

January 26. An experiment was made of compressing air by water, which was done in a large tube of six feet long, filled with water, and by letting into it a syringe open at one end, in which the air was at the depth of two feet and a half compressed about one inch, and at the depth of five feet near two inches.

There was also made the experiment to find, whether a ball horizontally projected, and another falling down perpendicularly, would come to the ground at the same time from the same height. This was done by blowing a small leaden bullet through a hollowed wooden cane, at the orifice of which there was a contrivance made for another leaden bullet of the same figure and size, to fall down straight; which being tried several times, the balls were judged by the ear of some of the members to come to the ground at the same time, by others not. For which reason it was thought necessary to make more trials at the next meeting.

Sir ROBERT MORAY acquainted the society with a new and easy way of bringing up fresh water from the bottom of the sea, where any bottom hath been found by navigators. He was desired to give it in writing, or to direct to the author, whence he had taken it.

* Letter-Book, vol. iv. p. 175. It is printed in the Philos. Transact. vol. v. 1748, p. 2063, for February 1679.

* Letter-Book, p. 156. It is printed in the Philos. Transact. n° 72, p. 2170.

Mr. OLDENBURG produced some of the rock-salt lately digged up in Cheshire, together with a letter to him from Mr. MARTINDALE, dated at Rotherston 7 Jan. 1672², mentioning, that the workmen had bored three yards into it. That an hot fire makes the salt crack and fly like bags of kelp or scatang: That hot water dissolves it speedily, and cold slowly: That being pulverized it is a very sharp salt, and the brown, that is free from mixture, full as sharp as the white. Some of this salt was delivered to Dr. DANIEL COXE to examine it, and to make a report of it to the society.

It was moved by one member, that Mr. MARTINDALE be asked, how far that salt-rock was from any salt-spring?

Dr. DANIEL COXE mentioned on this occasion, that he had tasted some of the salt made at Mayo, one of the isles of Cape Verde, and thought this to be like that salt.

Mr. OLDENBURG read part of a letter to him from Dr. PHILIP JAMES SACHS, one of the academy *Naturæ Curiosorum* in Germany, dated at Breslaw in Silesia, 1 Octob. 1670, accompanied with a copy of their *Miscellanea Curiosa Medico-physica*, printed at Leipzig in 1670, in 4^{to}, and consisting of an hundred and sixty observations medical, anatomical, botanical, pathological, chirurgical, and chemical, which they intended to prosecute by publishing such a book once every year; for the assistance to which they desired the communications of the curious in other nations, as well as their own.

Mr. OLDENBURG was desired to draw up a letter signifying the society's approbation of this attempt, and encouraging them to prosecute it³; as also to peruse the book, and give the society some account of the contents of it.

He produced likewise a printed book in Italian, composed by the jesuit LANA, and intitled *Prodromo, ovvero Saggi di alcune inventioni nuove promesse all'arte marisra*, sent by Mr. JOHN DODDINGTON, secretary to the English ambassador to the state of Venice.

It was recommended to Mr. OLDENBURG to peruse it, and to give the society some account of it.

February 2. Dr. DANIEL COXE produced some of the crystals and spirit, which a piece of the rock-salt lately discovered in Cheshire had yielded. This salt was thought by several of the members to be of the nature of strong sea-salt without any sal nitre or alum in it; good to season such things with, as need very strong salt. The spirit was esteemed very sulphureous.

² Letter-Book, vol. iv. p. 153.

dated 2 Feb. 1672, and entered in the Letter-Book,

³ Mr. OLDENBURG's letter to Dr. SACHS was vol. iv. p. 197.

The experiment of the horizontal and perpendicular fall of two bullets was tried again several times, and found by most of the members to come to the ground both together. It was ordered to be still farther prosecuted.

Mr. OLDENBURG read Dr. COTTON's letter of January 28, 167²*, containing a farther account of the stone, which stuck and increased in the urethra, attested by the patient himself, Tho. WESTCOTT: Which attestation was as follows:

"The time, that the stone was growing, was about 18 years, and was in the yard about 14 years, and grew always bigger, and of the bigness it was now: And I think myself to be about 88 years old. The first stopping of the urine was when the stone came into the yard. I voided the stone about three years since. The medicine was to boil a quart of white wine, and in that boil two or three burdock leaves, and boil it very well; then put into that the bigness of a hazel nut of black soap, and drink it morning, noon, and evening. Anoint the feat of your body very well with black soap, and take the skin of a snake, and strike it with Venice turpentine, and put it round behind the member, and come up over the yard close to the body."

Dr. COTTON remarked in his letter, that the orifice opened by the violence of the urine, was then closed up, and that the urine passed the ordinary way.

Mr. OLDENBURG read the Latin letter drawn up by him for Dr. SACHS, which was approved of, and ordered to be sent away.

He delivered to Mr. HENSHAW the Italian manuscript of Signor MONTANARI, formerly recommended to Sir SAMUEL Tuke and Mr. HOSKYNs for a translation of it into English; who having excused themselves from that work, the one because of his sickness, the other by reason of his absence from London, Mr. HENSHAW was desired to translate those papers, who promised to do it as soon as conveniently he could.

February 9. The former experiment of the horizontal projection and perpendicular fall of two bullets was tried again another way; and it seemed, that in most trials they came both together to the ground. It was ordered, that some things be mended in the instrument employed in this experiment; and that at the next meeting more trials be made, and that from a higher place.

Mr. HOOKE being asked, whether the air-vessel for a man to sit in was yet ready, answered, that it was, and that he now intended to make some experiments in it, and to report them at the next meeting. He added, that the chief design of this vessel was to find what change the rarefaction of the air would produce in man, as to respiration, heat, &c. Being asked, how it was contrived, he said, that it consisted of two runs, one included in the other; the one to hold a man, the other filled with water to cover the former, thereby to keep it stanch, with tops

* Letter Book, vol. iv. p. 193, 191.

to put on with cement; or to take off; one of them having a gage, to see to what degree the air is rarefied; as also a cock to be turned by the person, who sits in the vessel, according as occasion shall require, &c.

It was resolved, that after a report shall be made by Mr. HOOKE of the success of the experiments to be made by him this week, a day be appointed for as many of the Society, as pleased, to meet in Gresham-college, to see the vessel and some experiments to be made therein.

Mr. OLDENBURG read a letter written to him by Mr. MARTIN LISTER, from York 25 January, 1677¹, giving an account of another insect likely to yield an acid liquor as well as pisinires; which insect he called *the long and round bodied lead-coloured Julius*; as also several particulars concerning the bleeding of sycamores and walnuts immediately after frosts.

This gave occasion of much discourse concerning the motion of sap in trees, and of the texture of them.

Mr. HOOKE said, that he had observed, that there were several sorts of pores in trees; some of them went from the middle to the bark, shaped like little desks or boxes; others were like pipes going from the top to the bottom of the tree; others were exceedingly small, not seen but by a microscope, which he therefore called microscopical pores.

Sir ROBERT MORAY suggested, that it might be worth the while to inquire, whether all the nourishment of a tree comes by the root; or whether some be furnished by the ambient air.

Others moved, that it might be further inquired into, whether there be a circulation of the sap in trees? Dr. GODDARD said, that a strait ligature having been made about a vine-tree, there had been observed a turgescence as well above as beneath the ligature.

Mr. HOOKE proposed a contrivance to find with some certainty, whether there be a circulation in trees; which contrivance he was ordered to get made against the next meeting; which he promised to do.

Mr. EVELYN related, that an alce being watered in winter soon rots and dies at the root; but that being let alone, it thrives well.

He remarked likewise, that the *semper-vive* being exposed to the air would in two or three hours fill itself, and be fresh; and that the *anemom Plinii* would fill itself in half an hour in the open air.

It being queried, whether any trees would live, after a part of them had been

¹ Letter-Book, vol. iv. p. 159. It is printed in the Philos. Transact. vol. v. n^o 68, p. 2067.
disbarked

disbarked round, Dr. HOLDER mentioned, that the alder (*alnus*) would thrive, notwithstanding its being thus unbarked.

Mr. HOOKE being put in mind of his engine for grinding glasses said, that he would get the whole apparatus ready, as soon as he could.

It being observed, that very many things were begun at the society, but very few of them prosecuted, Mr. OLDENBURG offered to bring in a list of such particulars, which he was desired to do with speed.

February 16. The experiment with the two balls was made again by the contrivance of a bow; and they seemed to most of the members to come to the ground at one and the same time. Yet, for the sake of greater certainty, the experiment was ordered to be tried again at the next meeting.

Mr. HOOKE produced a model of a little box to be thrust into the body of a tree bored, to find out the ascent and descent of the sap. The care of making this experiment was committed to Mr. CHARLES HOWARD, who promised to undertake it.

Mr. HOOKE produced likewise a picture done by himself upon taffeta after an unusual way, viz. by printing it, and then giving it the colours, which appear equally well on both sides, being varnished over and transparent. He said he had the varnish from Mr. WYLDE.

Mr. OLDENBURG gave an account of the *Miscellanea curiosa mathematico-physico academica naturæ curiosorum*; and some of the observations contained in that work were esteemed considerable, and the compilers of it worthy to be encouraged in the prosecution of it.

Mr. RICHARD REED having sent some red-streak grafts out of Herefordshire, with a letter to Mr. OLDENBURG dated January 30, 1677¹, concerning cider made of rotten and frozen apples, and the quantity of cider lately made in that county, and the nature of red-streak, which is delicate with respect to its soil; those grafts were distributed to several of the members.

Feb. 23. Mr. HOOKE reported concerning the air-vessel, that he had been in it for about a quarter of an hour, and found not any inconvenience upon the exhaustion of the little air drawn out of it. He added, that he conceived, that a man could not endure much more than the evacuation of a fourth part of the air contained in this vessel.

He was ordered to prosecute this experiment, and to take some animals and lighted candles &c. with him into the vessel.

It was also resolved, that on the Monday following in the afternoon as many of the society as pleased should meet in Gresham-college at Mr. Hooke's lodgings, and be present at the experiment.

Mr. Hooke mentioned, that he intended to employ a pair of bellows in the vessel, in order to blow out the air more readily and more effectually.

Mr. OLDENEURO read a letter to him from Mr. LISTER, dated at York Feb. 15. 1677^a, containing an account of his considerations and trials relating to the circulation of sap in trees; as also his thoughts and observations about colours, and particularly how he had been led to a method of fixing colours, of which he promised to shew the experiment before the Royal Society, when he should have an opportunity; adding, that he had found out a colour (yielded him by an English vegetable) which might be compared to the best ink, and would not change either by fire or salts.

March 2. Sir JOHN WILLIAMS, bart. was proposed candidate by the lord bishop of CHESTER.

Mr. Hooke made a report of the success of the experiment made in the vessel for rarefying the air, viz. that himself had been in it, and by the contrivance of bellows and valves blown out of it one tenth part of the air (which he found by a gage suspended within the vessel) and had felt no other inconvenience but that of some pain in his ears at the breaking out of the air included in them, and the like pain upon the readmission of the air pressing the ear inwards.

It was ordered, that this vessel should be in readiness to make the experiment for those of the society, who should be at leisure to go to Gresham-college, and be present at it on the Monday following in the afternoon.

The bishop of CHESTER renewed his former proposal of cutting the kidney of a dog, which experiment he had formerly made twice with good success. He was seconded by Dr. KING, who affirmed, that he had made the like experiment with good success, the dogs having in both experiments recovered and lived.

It was ordered, that Dr. GODDARD, Dr. CLARKE, Dr. NEEDHAM, and Dr. KING, who were then present, should be desired to take care of making this experiment, and to agree on the Monday following about the time of making it.

Dr. NEEDHAM proposed to try the cutting off a piece of the guts, for instance of the colon, and to stitch together the two ends, to see whether they would heal up again; which, if it succeeded, might be of good use in the iliac passion.

The physicians, who were present, were desired to take care of this experiment likewise.

^a Letter-Book, vol. iv. p. 211. It is printed in the Philos. Transact. vol. vi. n^o. 70, p. 2121 and 2132. for April 1671.

Dr. CLARKE proposed, that a man hanged might be begged of the King, to try to revive him; and that in case he were revived, he might have his life granted him.

Mr. OLDENBURG mentioned, that there were come to London two noble Florentines, the marquis BARTHOLOMEI and count BARDI, who were desirous of being present at a meeting of the society, and of seeing some experiments; and that they would come to the next meeting: on which account Mr. HOOKE was appointed to prepare some experiments against that meeting for their entertainment.

March 9. Sir PHILIP MATTHEWS was proposed candidate by Dr. ALLEN.

There were present at this meeting the marquis BARTHOLOMEI and count BARDI, as also the resident of Venice; and the following experiments were made, 1. One furnished by Mr. BOYLE of water falling in an exhausted tube to the bottom like a metallic body, there not being air to break the fall. 2. One contrived by Mr. HOOKE, whereby some flour put in a wide shallow glass, with a large sloping brim and a pretty tall foot, was made to rise and run over like a fluid, by the knocking of the glass, and by the forcible moving of one's finger round about the upper edge of the same. Leaden bullets likewise being put in this glass moved in it like a fluid upon its being knocked.

This was proposed, in order to consider, what might be the cause of this motion, especially of the phenomenon, that the flour ascending ran over, and did not fall any way back into the vessel. Mr. HOOKE mentioned, that he thought, that it might contribute to explain the cause of gravity, and suggest an hypothesis for explaining the motion of gravity by.

It was ordered, that vessels of different metal should be prepared for the making of this experiment, especially of brass, to strike the more forcibly.

After this there was produced a burning concave of sixteen inches diameter, lately made by Mr. CHRISTOPHER COCKS, who was said to be ready to undertake the making one of six feet diameter for one hundred pounds sterling. It was thought fit, that he should be encouraged to perform his undertaking, a burning concave of that size being likely to increase heat to such a degree, as nothing else in nature would be able to effect the like.

The air-vessel being again spoken of, it was ordered, that since Mr. HOOKE had failed in making the experiment at the time before appointed, it should be made on the Monday following in the afternoon, several members promising to be present.

Mr. HOOKE observed, that he had lately observed 4 March the congress of the moon with the *media trixium in cauda arietis*, a fixt star of the third magnitude, and had found the time of its subingress pretty near to that calculated by Mr. FLAMSTEAD, who set down the time to be 10 h. 14'. 52". which was found to be 10 h. 12'. *circa*. Mr.

Mr Hooke remarked likewise, that he had observed, that whereas a star, as soon as it touches, uses to disappear, this star touching the south part of the moon shined all along the sides of the edge of the moon, which he thought could proceed from nothing but the refractive air about the moon.

It was moved, that persons residing in far different latitudes might be engaged to correspond with the members of the society in making such observations as these; and that capt. HUBBARD, then going to Jamaica, might be solicited to take care of them.

Mr. OLDENBURG read a letter to him from Mr. LISTER, dated at York, March 4, 1677, containing a confirmation of what he had before written about an English black to be made out of a vegetable; as also an account of the kermes-berries in Languedoc breeding worms, and of the drying and preparing them for medical uses. "When I was, says he, in Languedoc, I was credibly informed, that some of the gatherers of the reputed berries [kermes] did not wait until the worm had made itself up within a round husk or chrysalis, affixed to the branches of the shrub-oak, but did take the worms themselves, and exposing them to the scorching sun in a sheet suspended by the four corners, beating still upon it, as the worms crept up, to make them perish by heat, and thus dried, they prepared them for farther use, either medical or ornamental. Again, that they use in that country to set fire on the ilex or shrub-oak (as we in England burn up our ling, i. e. *erica* in the moors) when it is grown old and dry barked, to the end it may put up again with more tender and succulent shoots fitter for the nourishment of the kermes-insect."

Mar. b 16. The SOCIETY did not sit.

Mar. b 23. Sir JOHN WILLIAMS and Sir PHILIP MATTHEWS were elected.

ROBERT REDDING, esq; was proposed candidate by the president.

Mr. Hooke brought in a report of the experiment, which he had again made in the air-vessel; which was, that he had blown out one fourth of the air that was in the vessel, estimated by a gage; and that he had continued in it somewhat above a quarter of an hour without any other inconvenience than feeling some pain in his ears, and finding himself deaf, whilst the straining of the air was upon him in blowing out the air; which pain and deafness he likewise found upon the forcible rushing in again of the air into his ears: but that when he was come out, and had walked a little while up and down, his hearing returned. He added, that having taken a candle burning with him into this vessel, the candle went out long before he felt any of that inconvenience in his ears.

The president, who had been at this experiment, remarked, that though Mr. Hooke had continued somewhat above a quarter of an hour in this engine, yet a

quarter of the air in the vessel had not been kept out all that while, but that now and then fresh air had been let in. In the mean time Mr. Hooke had endured for a little while the absence of a quarter of the air without any other inconvenience than the above-mentioned.

Mr. Hooke exhibited again the experiment of making flour move in a bell-glass like a fluid several ways, upon the knocking of that vessel in several places; upon which he thought considerable things in philosophy depended, but declared no particulars.

He also shewed a method of making a very great burning concave by means of several pieces of glass lined with a mixture of mercury and lead, and put together upon the concave side of some hemispherical body of wood. He was desired to make a trial of it.

Mention being again made of Mr. Cocks's readiness to make a great burning concave, it was suggested, that the King might be moved to command it to be made.

Mr. OLDENBURG produced and read several letters sent to him from abroad. First two letters from Mr. WINTHROP dated at Boston in New-England; one addressed to the lord BRERETON, October 11, 1670, giving an account of the removing and overturning a hill in those parts.

This letter was as follows^a:

" My Lord,

" **T**HE relation, which I am now presenting to your lordship, is of a very strange and prodigious wonder, this last summer in this part of the world: that the like hath been known for the whole manner of it, I do not remember, that I have read or heard. There was a hill near Keenebank-river, in the province of Meane, the eastern part of New-England, which is removed out of its place, and the bottom turned upwards. The time is not certain when it was done; but that it is so, is very certain, and it is concluded by those, who live nearest to it, that it was removed either the latter end of June, or beginning of July last. The relation, that I have from credible persons concerning the manner of it, is this; viz that the hill being about 8 rods from Keenebank-river-side, on the west side of the river, about 4 miles from the sea, was removed from its place over the dry land about 8 rods or perches, and over the tops of the trees also, which grew between the hill and that river, leaping as it were over them into the river, where it was placed, the upper part being downward, and dammed up the river, till the water did work it a passage through it. The length of the hill was about 250 foot; the breadth of it about 80, the depth of it about 20 foot. The situation of the place, as to the length of it, was N.-W. and S. E. The earth of it is a blue clay without stones: many round bullets were within it, which seem to be of the same clay hardened. I have not yet seen the place myself,

^a Letter-Book, vol. iv. p. 93.

" but sent purposely to enquire into the truth of what had been reported concerning it, and had this relation from major WILLIAM PHILIPS, who dwelleth not far from the place : And M. HERLAKENDON SYMONS, who went to the place, and took very good notice, brought me the same report of the truth and manner of it, which I had before received by a letter from major PHILIPS in answer to my letter of enquiry, and told me, that the earth of the hill did not lie between the former place of the hill and the river, but was carried together over the tops of the trees into the river, which seems to be, as if it were blown up by such a force, as carried the whole body of it so far together. I had from them some few of those round bullets ; I think there were but two or three, and some pieces of earth in other forms, which were found upon that now upper part, which was before the lower, or the inner bowels of that hill ; as also a small shell or two, of a kind of shell-fish, like some shell-fish commonly found, where the sea flows : but how they should be within that hill, is strange to consider. I have sent all, that I had thence, to the Royal Society for their repository. I understand also from those parts, that there was no notice taken of an earthquake about that time ; nor did I hear of any in other parts of the country. I give your lordship only a relation of this prodigy, as I had it upon the best enquiry I could make, leaving the discussion of the natural causes, which might concur ; a matter too hard for me to comprehend, but the power of his Almighty Arm is manifest to all, who weigheth the hills in a balance, and in whose presence the heavens drop, the hills are melted like wax, Sinai itself is moved. I hope to have opportunity to see the place ; and if any other matter considerable upon my observation, or further enquiry shall appear, I shall be obliged to give your lordship a further account thereof ; and for the present am bold, only to subscribe myself,

" Right honourable,

" Boston, Oct. 11, 1670.

" Your Lordship's humble servant,

" J. WINTHROP."

The other letter of Mr. WINTHROP was written to Mr. OLDENBURG of the same date¹, containing an enumeration of several things sent by him to the society for their repository, viz. 1. A peculiar sort of shell-fish, called in New-England, the horse-foot. 2. A feathered fly. 3. A humming-bird's nest with two eggs in it. 4. Some shells and bullets and hardened clay found within that mountain, which had been overturned.

A letter of Signor MALPIGHI to Mr. OLDENBURG from Bologna, Feb. 20, 1671, N. S. was read, containing several curious remarks on the communication between the bronchizæ and lungs in frogs, lizards, and tortoises ; as also on the fibres of the spleen not being nervous but carneous.

¹ Letter-Book, vol. iv. p. 91. vi. 2^a 71. p. 2149. for May 1671.

² Ibid. p. 221. It is printed in the *Philos. Transact.* vol.

The bishop of CHESTER moved, that Sir GEORGE ENT being concerned in this letter, a copy of it might be given him to consider it, and to make a report of it to the society : which was ordered to be done.

There was likewise read part of a letter to Mr. OLDENBURG from GODFREY WILLIAM LEIBNITZ, doctor of both laws, and counsellor to the elector of Mentz, dated March 11, 1670^o, containing a short account of a new (as he thought) physical hypothesis of his for solving the phenomena of nature, of which he had sent part already printed, and dedicated to the society, desiring their judgment. The title of it was *Hypothesis physica nova, quæ phenomenon naturæ plerumque causæ ab unico quodam universali motu in globo nostro supposito, neque Tyconicis neque Copernicanis asseruendo, repetuntur* °.

It was ordered, that Mr. BOYLE, Dr. WALLIS, Dr. WREN, and Mr. HOOKE should be desired to peruse and consider this book, and report their sense of it to the society, in order that a proper answer might be returned to the author.

March 30, 1671. Mr. SAMUEL MARTIN was proposed candidate by Dr. HOLDER.

Mr. HOOKE represented by quicksilver in a triangular vessel sharp at one end the reason of the tide's rising so high upon the coast of Bristol and in some other places ; which however was thought by some of the members not sufficient to explain the exceedingly high tides upon the coast of Bretagne in France.

Mr. HOOKE produced his glass-bell with flour in it, to shew to the eye, that, according to the several strokes or pulses made upon the glass, the air thence receives as many several impressions ; it being manifest by this experiment, that as every different stroke made a different sound, so the making a different impression upon the flour gave it as many several motions. It appeared also, that the powder goes from the place, whence the pulse comes ; and that in a perpendicular pulse the powder hath a kind of vibration : as also, that as long as the sound of the bell lasts, the powder seems to be fluid, but, as soon as that ceases, the powder also lies still.

It being conceived, that this experiment might much contribute to the explication of the nature of the internal motion in bodies, Mr. HOOKE was ordered to prosecute it.

* Letter-Book, vol. iv. p. 234. In the same volume p. 51. is a letter of Monfr. LEIBNITZ to Mr. OLDENBURG dated at Mentz, August 23, 1670, expressing his regard for the Royal Society, and mentioning his new hypothesis for explaining the phenomena of nature. There is likewise p. 85. another letter of his to Mr. OLDENBURG

dated at Mentz Sept. 28, 1670. concerning the true rules of motion, the continuity and consistency of bodies, the nature of points, variety &c.

° This is the title of the edition of Mentz in 1671 : but that of the London edition in 1673 in 12^o. is *Hypothesis physica nova, five theoria motus concreti, una cum theoria motus abstracti*.

He reported concerning the experiment made in the air-vessel, that when he was in it, he found not his heart beat quicker, his pulse continuing the same.

Mr. HENSHAW produced a small twig surrounded in part of it with circles of the eggs of an insect, very curiously and orderly laid together and fastened about it; which he supposed would be hatched in due time. It was delivered to Mr. OLDENBURG to be sent to Mr. WILLUGHBY for observation.

Mr. HENSHAW gave in his English translation of Signor MONTANARI's Italian manuscript concerning the phenomena of the glass drops, and the cause assigned by him of them. It was ordered, that it should be read at the next meeting, and the members desired to meet precisely at three of the clock on account of the length of these papers.

Mr. OLDENBURG read a letter of Mr. LISTER to him dated at York March 17, 1678^a, containing accounts of some very aged persons in the North of England, one 126 years old, another 112, two 108; and several remarkable experiments, in order to examine the truth of these queries, viz. Whether saps are not to be found at all times of the year in a much like consistence and quantity in the respective parts of a vegetable; and what communication one part of a plant may have with another, in relation to the ascent and descent of sap.

Mr. OLDENBURG presented to the society the fifth volume of the *Philosophical Transactions*.

Dr. WALTER NEEDHAM communicated a letter to himself from Mr. JOHN TEMPLER of Braybrook in Northamptonshire^b, giving an account of two hurricanes, that happened in that county, one October 30, 1669, the other October 13, 1670.

April 6. Dr. WALTER NEEDHAM was admitted.

Mr. HENSHAW read part of his translation of Signor MONTANARI's paper concerning the glass drops: and as this discourse was long, and deserved consideration, fifty copies of it were ordered to be printed by Mr. MARTYN, the society's printer, that it might be the more conveniently distributed amongst the members for their perusal.

Mr. HOOKE mentioned a method, which he had, for discovering the texture of wood by filling all the several pores thereof with mercury, of which he exhibited a specimen in charcoal, promising to shew the manner of doing it at the next meeting.

April 13. The society did not meet.

^a Letter-Book, vol. iv. p. 251. It is printed in the *Philos. Transact.* vol. vi. n^o 70. p. 2123. for April 1671.

^b Letter Book, p. 291. *Philos. Transact.* n^o 70. p. 2156.

April 20. Mr. Hooke shewed the way of filling the several pores in wood with quicksilver, doing it at this time upon a piece of charcoal. He was desired to bring in an account in writing of the manner of doing it; as also of what was discovered by it: and this experiment was ordered to be made at the next meeting upon wood not charred.

He mentioned, that he intended to try the same with fine plaister of Paris, confiding, that if it will soak in, it will look white enough, and reflect not so much glaring light as mercury does.

Mr. OLDENBURG read two letters to him, one in Latin by Dr. WALLIS from Oxford April 7, 1671, containing his thoughts of Monfr. LEIBNITZ's *Hypothesis physica nova*, recommended by the society to the examination of him among others.

It was ordered, that the doctor should receive the thanks of the society for this good account; that his letter should be entered^{*}, and hereafter compared with the sentiments of those other persons, who had been desired to consider the *Hypothesis*; and that thereupon an answer should be written by the secretary to Monfr. LEIBNITZ, containing the judgment of the said persons concerning that *Hypothesis*.

The other letter was written by Mr. LISTER from York, April 8, 1671^{*}, containing partly some more experiments about the motion of juices in vegetables, brought within the air of the fire; partly an intimation of a little *pyssillus*, or cake of English black drawn by him out of a vegetable, and sent to be examined by the society, who referred the said cake to Mr. BOYLE.

The business of the burning concave being again spoken of, it was thought necessary, that the president, Dr. WREN, and Mr. Hooke should be desired to agree upon the portion of the sphere or parabola, that is sufficient to make all the rays meet in a point; and that Mr. Hooke should bring in at the next meeting a demonstration, shewing how many degrees are just necessary to make all rays thus unite.

Mr. Hooke advanced an assertion, importing, that a concave made of a little sphere, reducing all the beams of the sun into a narrow focus, shall burn stronger than a concave made of a greater sphere, leaving the sun-beams more at large. This he said was demonstrable.

Mr. OLDENBURG produced Signor MONTANARI's Italian discourse of the galls drops in print, with a second part; and said, that upon the receipt of this he had stopped the printing of the first part, which had been ordered 6 Apr. 1.

Mr. HENSHAW was desired to translate into English this second part, as he had done the first; which he promised to do.

^{*} Letter-Book, vol. iv. p. 263. It is printed in the Philos. Transact. vol. vi. n° 74. p. 2227. for Aug. 1671.

^{*} Letter-Book, p. 278. The first part of it is printed in the Philos. Transact. vol. vi. n° 70. p. 212.

April 27. There were read two letters of Mr. WILLUGHBY to Mr. OLDENBURG dated at Middleton, the one March 16, 1672¹, the other April 21, 1671², containing some experiments about the bleeding of trees, but especially about the transmitting of water through fycamore, walnut, and birch-trees.

It was ordered, that this experiment of transmitting water through the branches of trees be made before the society at their next meeting.

There was made a microscopical experiment with a *fungus* of wood, which appeared in the microscope to be all fibrous, and to resemble in its texture skin tanned.

Mr. HOOKE being put in mind of performing at least his promise of measuring the quantity of a degree upon the earth, engaged to do it within a month.

He was likewise exhorted to prosecute the observation of the parallax of the earth's orb; concerning which he said, that he thought indeed he should find a parallax, unless it be said, that there may be a variation in the perpendicularity.

He was also called upon to give the demonstration, which he had promised, of the quantity of the sphere, that is sufficient to make all the sun-beams meet for a burning concave: which not having ready, he was desired to bring it in at the next meeting.

It was likewise ordered, that what he had prepared for the mensuration of the earth, as also his apparatus for observing the parallax of the earth's orb, should be by him brought in writing, to be entered in the register-book, in order to secure both from the claims of strangers.

It was moved, that the experiment with the glass bell and powder should be prosecuted for the discovery of the internal motion of bodies: and

That a receiver should be fitted to the pneumatic engine, for the putting in of an arm, and exhausting the air.

May 4. There was made an experiment of transmitting mercury through wood, by putting a plug of willow-wood at the bottom of a glass-cane, and pouring mercury upon it: the success of which was, that the quicksilver made its way through the wood from the smaller end downwards more easily than from the thicker end to the smaller, agreeably to Mr. WILLUGHBY's experiment, who having poured water through branches of birch, holding the great ends upwards, found the water to drop out at the smaller ends; and doing the same through the like branches by holding the smaller ends upwards, found the water to drop out faster through the wood at the larger ends.

¹ Letter-Book, vol. iv. p. 240. It is printed in the Philof. Transact. vol. vi. n° 70. p. 2125. of it is published in the Philof. Transact. n° 70. p. 2141.

² Letter-Book, vol. iv. p. 278. The substance

This

This piece of wood being cut, the mercury appeared in all the parts of it, except the pith and bark, in both which there appeared none at all.

This experiment was also made by blowing air through the same wood with spittle on it, which passed readily one way, namely from the smaller end to the greater, and difficultly the other way.

It was moved, that this experiment should be tried with several sorts of wood of different ages and lengths, in canes of several lengths, to see, what weight of quicksilver will pass through what lengths of wood: and that the like might be tried upon stones and metals, and especially copper and iron.

Mr. OLDENBURG mentioned, that the curious abroad had began to see again the new star about the beak of the swan, which was first seen the last year: as also that observations were begun to be made of Saturn, it being presumed, that, according to Monfr. HUYGENS's system of that planet, the *anulus* thereof would not be seen that year.

Mr. OLDENBURG desired, that Mr. HOOKE might be put in mind to observe the obscuration of a fixt star, which would happen, according to Mr. FLAMSTEAD's pre-advertisement, on the 6th of that month of May.

Mr. HOOKE was accordingly desired to take notice of these particulars, and to join with Dr. POPS in observing them.

There was produced by Mr. OLDENBURG a manuscript sent to him from Paris by Monfr. MARIOTTE, one of the Royal Academy of Sciences there, about levelling, and some new methods of performing it, written in French; the author desiring in a letter written by Monfr. JUSTEL, April 29, 1671, that it might be communicated to the Royal Society.

This manuscript was delivered to Dr. WREN, who was desired to examine it, and to make a report of his thoughts about it to the society.

There was produced a printed paper sent from France to Mr. COLLINS, giving an account of some odd qualities of a certain stone of Mexico, being a strainer of many sorts of liquor, particularly of wines, rendering them aqueous by percolation.

Dr. CROUNE remarked, that such stones were to be had at Malaga, and promised to endeavour to get one of them brought to the society.

Mr. OLDENBURG mentioned, that Mr. BOYLE had such a stone dug up in Northamptonshire, called the Kettering stone, which also proved a strainer; and that divers experiments were intended to be made with it.

Monfr. LEIBNITZ's *Hypothesis physica nova* was delivered to Mr. HOOKE to be examined by him.

May

May 11. At a meeting of the COUNCIL were present

The President

Mr. AERSKINE
Sir ROBERT MORAY
Sir JOHN LOWTHER
Sir PETER WYCHE
Sir JOHN BANKES
Sir JAMES HAYES

Dr. TIMOTHY CLARKE
Dr. GODDARD
Mr. COLWALL
Dr. BROWN
Mr. OLDENBURG.

Dr. CLARKE and Sir JOHN LOWTHER were sworn as members of the council.

There was read a petition of ROBERT THORNHILL, esq; to the Royal Society relating to Chelsea-college; which being debated, it was ordered,

That Mr. CHARLES HOWARD, Sir ROBERT MORAY, Sir PAUL NEILE, Sir JOHN LOWTHER, Sir PETER WYCHE, Mr. HENSHAW, or any two or more of them, be a committee to consider of the said petition, and to treat with Mr. THORNHILL about the particulars contained therein; and that they meet the first time on the Monday following, being May 15, at ten of the clock, at Sir ROBERT MORAY's chamber, calling in for their assistance, if they should think fit, his Majesty's surveyor-general Dr. CHRISTOPHER WREN, and Mr. HOOKE.

It was ordered, that the treasurer continue to pay to Mr. HOOKE his salary of thirty pounds a year, from the time of his last payment, which was appointed to be made to him by an order of the council of April 27, 1670: and

That the treasurer pay likewise five pounds, to be left in the hands of the president, and by his lordship to be disposed of to SPENCER HICKMAN stationer, for his encouragement in printing Mr. HORROX's manuscripts relating to astronomy.

There was licensed Dr. NEHEMIAH GREW's book, intituled, *The Anatomy of vegetables begun; with a general account of vegetation found'd thereon*; and it was ordered to be printed by the society's printer*.

At a meeting of the SOCIETY on the same day,

Mr. HOOKE being called upon for making the experiments appointed at the last meeting, of transmitting mercury through several sorts of wood and through iron, said, that he had made one at home with elder wood, and found no mercury at all in the pith of it. He added, that he conceived the pith to be a congeries of bladders, having no visible communication with the other parts of the wood, as the pith of quills is nothing but a congeries of bladders.

It was ordered, that more of this sort of experiments be made at the next meeting before the society; and that that with iron and quicksilver be not neglected.

* It was printed at London in 1671 in 8vo.

It was ordered, that more of this sort of experiments be made at the next meeting before the society; and that that with iron and quicksilver be not neglected.

Mr. HOOKE gave some account of the observations made by him of the moon obscuring a fixt star of the fourth magnitude, 6 May, 1671, pre-advertised by Mr. FLAMSTEAD, viz. that whereas by Mr. FLAMSTEAD the time of its ingress had been calculated 9°. 9'. 57". he found it enter about 23 minutes after 9 of the clock; and that its *mora* under the moon was as long as had been calculated, unless there were a difference of a few seconds. He added, that he had made this physical observation, that the star at an equal distance from the light of the moon did not appear above a quarter as big on the light side as on the dark side.

Mr. HOOKE returned Monsr. LEIBNITZ's *New Physical Hypothesis*, which had been committed at the last meeting to his perusal, and said, that he was not satisfied with it. Whereupon Sir ROBERT MORAY took it with him to recommend it to the examination of Dr. PELL.

Mr. OLDENBURG read a letter to him from Mr. HEVELIUS, dated at Dantzick, May 1, 1671, N. S.², giving an account 1. Of the occultation of two stars in *cauda arietis*, 2. Of the occultation of *spica virginis*; both by the moon, the former 14 March 1672, the latter 22 April 1671, N. S. according to the pre-advertisements of Mr. FLAMSTEAD sent to him. 3. Of the second appearance of the new star, first discovered the last year, *circa rostrum cygni*. 4. A description of an odd fiery meteor lately seen at Dantzick.

This gave occasion to mind Mr. HOOKE to observe this new star in the Swan, as also to observe the present phasis of Saturn presumed to appear now with the *ansea*.

There was again produced by Mr. OLDENBURG the French manuscript composed and sent by Monsr. MARIOTTE about levelling; upon which the author desired the judgment of the society, who ordered it to be delivered to Dr. WREN then present, for his consideration.

Mr. HOOKE promised to send Mr. HEVELIUS a scheme of the instrument for measuring the diameters of the stars, and taking small distances; as also to send to Mr. FLAMSTEAD his late observation of the stellar eclipse of May 6, 1671.

May 18. MARTIN LISTER, esq; was proposed candidate by Mr. OLDENBURG.

An experiment was made with a piece of green willow cut asunder, and the small ends dipt in a coloured liquor, which filtered up through it.

The pith of an elder was also dipt in a coloured liquor, and it run up the sides of the pith, and not at all in the inner parts of it.

² Letter-Book, vol. iv. p. 295. An Extract of it is printed in the Philos. Transact. vol. vi. n° 73, p. 2197, for July 1671.

Vol. II.

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Mr.

MR. FLAMSTEAD's letter to Mr. OLDENBURG, dated at Derby May 13, 1671*, was read, giving an account of the stellar eclipse May 6, 1671.

MR. HOOKE was ordered to communicate his observation of that eclipse to Mr. FLAMSTEAD, who earnestly desired it.

DR. WALLIS's letter to Mr. OLDENBURG, dated at Oxford 13 May, 1671*, was read, containing his thoughts concerning the experiment, wherein the mercury, when perfectly freed from air, is found to stand top-full in the cane, without subsiding to the usual station; which shewed, that this experiment is not solvable by any equiponderancy of the air, but requireth something else to be taken in to solve it.

A letter was read likewise from Monfr. LEIBNITZ to Mr. OLDENBURG, dated at Francfort 29 April, 1671, O. S. * accompanied with his *Theoria motus abstracti*, recommended to the judgment of the society, which piece was delivered to Mr. HOOKE to examine it.

May 25. There was made a microscopical observation of the pith of an elder and of that of a quill, to shew, that such pith is nothing but a congeries of little bubbles or bladders, that seem to be severed from, and to have no communication with the rest of the plant.

It being queried, how the pith groweth, it was thought worth farther inquiry, whether there be any minuter pores in them, than have yet been discovered, through which any nourishment may pass.

MR. HOOKE being asked, what observation he had made of the late eclipse of Saturn by the moon, said, that he had missed of that observation.

He acquainted the society, that he had perused and considered Monfr. LEIBNITZ's *Theoria motus abstracti*, but was of opinion, that he had not hit right.

MR. OLDENBURG was desired to send it to Dr. WALLIS for his opinion :

There was read a letter of Mr. LISTER to Mr. OLDENBURG from York 22 May, 1671*, giving an account of certain *matrices* or insect-husks of the kermes kind, observed on many trees.

This gave occasion to some of the members to discourse of the various excrescences of plants, conceived by some to be produced by flies or other insects casting their seed upon plants, which sending up juice to the plant thus fly-blown bred an intumescence there, which became a matrix to the seed to grow into a living creature of that kind of insect, that had cast its seed there; and this coming

* Letter-Book, vol. iv. p. 300.

* Ibid. p. 303.

* Ibid. p. 285.

* Ibid. p. 305. It is printed in the Philosoph. Transact. vol. vi. n° 71, p. 2165, for May 1671.

to maturity eat its way out of the matrix, and flew away; whence are produced the holes in those excrescences.

Mr. Hooke promised to shew at the next meeting an instrument for measuring exactly all the way of a journey, with all the angles thereof.

June 1. The Society did not meet.

June 8. There were presented to the society Mr. BOYLE's second tome of the *Usefulness of experimental natural Philosophy*, printed at Oxford 1671, in 4°, and Dr. EDWARD CHAMBERLAYNE's *Anglicæ Notitia*, first and second part in one volume.

Mr. Hooke produced an instrument for surveying, to be applied to a chariot, whereby what line or angle shall be made by a chariot thus fitted, shall be described upon paper.

He was ordered to get a chariot made, and to apply this instrument to it against the next meeting.

He mentioned, that he had a way to shew the several quarters of the world in a travelling chariot, so that wherever a person goes, he shall have a hand standing always north and south. He was desired to produce it before the society.

The secretary mentioning, that this being a proper season for making observations of the needle's variation, it was agreed, that on the Saturday following the president, Sir ROBERT MORAY, Mr. Hooke, and such others of the society as pleased, would meet at Sir ROBERT MORAY's chamber at Whitehall, and take a good meridian by the sun in the forenoon and afternoon, and by the north star in the evening. Mr. Hooke was desired to have the apparatus ready for that time.

Dr. WALTER NEEDHAM communicated to the society some curious observations concerning glow-worms by Mr. JOHN TEMPLER, sent in a letter to the Doctor, dated 31 May, 1671^c.

The president made a report of Mons. MARIOTTE's treatise about levelling and certain new instruments described by him for exact levelling, viz. that he thought the author had well considered that whole matter, and that his instruments were well contrived for exact practice; and that the manuscript deserved to be published.

Mr. OLDENBURG read a letter to him from Mr. LISTER dated at York 30 May, 1671^d, concerning an insect, which, though feeding upon hen-bane, a plant of a most offensive smell, hath yet itself an aromatical and agreeable one.

^c These observations are printed in the *Philos. Transact.* vol. vi. n° 72, p. 2177, for June 1671. ^d Letter-Book, vol. iv. p. 309. It is printed in the *Philos. Transact.* n° 72, p. 2176.

June 15. The experiment appointed at the last meeting of trying the application of the new surveying instrument to wheels was made with good success: And it was thought, that if the whole apparatus necessary for it be accurate, it would answer the design. Mr. Hooke was desired to bring in a description of it in writing.

There was produced a Latin paper of Monsr. BULLIALDUS concerning the late appulse of the moon to *spica virginis*; which happened 12 April, 1671, O. S. and comparing his *calculus* with the observation of Monsr. HEVELIUS. It was ordered to be entered in the Register-book*.

Mr. COLLINS presented to the society from the author JOHANNIS ALPHONSE BORELLI de *Motionibus naturalibus à Gravitate pendentibus* printed Regio Julio 1670, in 4^{to}.

Mr. Hooke mentioning, that he wanted conveniencies at Gresham-college to make astronomical observations, it was referred to the council to consider of building a turret there for that purpose.

The observation for taking an exact meridian by the north star was again recommended to the president, Sir ROBERT MORAY, and Mr. Hooke.

It was appointed, that at the next meeting the curator should make the experiment to shew the various motion in the internal parts of liquors.

June 22. The experiment for shewing the internal motion of liquors was made, by putting some small pieces of charcoal into spirit of wine in an open glass, which being viewed through a large microscope appeared to have a very vehement motion every way, though to the naked eye there appeared none.

It was remarked, that this experiment is to be made with liquors, that are not dissolvents of the bodies swimming in them, such as spirit of wine is in reference to coal.

Mr. Hooke said, that there was no such motion in common water or vinegar; and that he was of opinion, that all spirituous liquors would exhibit such a motion.

The president moved, that this experiment might be tried in a small glass-bubble sealed up, to see, whether the absence of the ambient air had any influence in producing this effect, or not; as also, that convenient bodies should be put into the spirit, and left in it for some time, to examine them till they were at rest, if they would be so. This was ordered to be tried at the next meeting.

Mr. SMITHWICK shewed the society a small telescope of six inches and a half long, of his own contrivance and workmanship, which being compared with ano-

* Vol. iv. p. 120.

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ther of fourteen inches long, esteemed to be a good glass of the kind, shewed the objects as distinctly, and magnified them almost as much as the longer glass, in the opinion of several members of the society, looking through them both. He was encouraged to proceed to the making of bigger glasses.

A piece of lignum aloes with gum in it was presented by Mr. BOYLE for the repository.

Mr. OLDENBURG read a letter to him from Mr. LISTER dated at York June 14. 1671¹, concerning the hatching of a very small kind of bees out of the *Patella Kermi-fermes* sent formerly by him.

June 30. The spirit of wine in the experiment for shewing the internal motion of liquors, being hermetically sealed up, according to the order of the last meeting, was found by this exclusion of the air to have no such vehement motion, as it had before, when exposed to the air, but only the motion of gravity.

Mr. OLDENBURG read a letter to the society from Dr. FRANCIS DE LA BOE SYLVIVS, Professor of Physic in the university of Leyden, dated there 19 June, 1671, N. S.² accompanied with nine copies of his *Praxis Medicæ Idæ nova*, printed there in 1671, and six copies of his *Oratio de afflicto epidemii A. 1669. Leidam depopulantis causis naturalibus* printed there in 1670, in 12°. The nine former were distributed, one to the society for their repository, one to the president, two to the two secretaries, and the remaining five to Sir GEORGE ENT, Dr. GLISSON, Dr. TIMOTHY CLARKE, Dr. GODDARD, and Dr. WILLIS. Of the six orations, one was delivered to Mr. HOOKE for the repository, one to the president, and the other four to Sir GEORGE ENT, Dr. CLARKE, Dr. GODDARD, and Mr. OLDENBURG.

It was ordered, that Mr. OLDENBURG should write a letter of thanks in the name of the society to Dr. SYLVIVS; and he having considered with himself, that the society might discontinue their meetings for the present, and for that reason having prepared a draught of such a letter³, it was read, approved of, and ordered to be sent away.

The society adjourned their meetings till the president should think proper to summon them again.

November 2. The society resumed their public meetings.

ROBERT REDDING, esq; and MARTIN LISTER, esq; were elected.

NEHEMIAH GREW, M. D. was proposed candidate by Mr. HOOKE.

¹ Letter-Book, vol. iv. p. 313. An Extract of it is printed in the Philos. Transact. vol. vi. n° 73, p. 2196, for July 1671.

² Letter-Book, vol. iv. p. 320.

³ It was signed by the president and dated July 3, 1671, and entered in the Letter-Book, vol. iv. p. 332.

Mr. OLDENBURG produced many letters written to him during the society's recess, both from abroad and out of the country; together with several presents for the library and repository of the society:

1. A Latin letter of Signor JOHN ALFONSO BORELLI dated at Messina 10 April, 1671¹, accompanied with a present of six copies of his *Historia & Meteorologia Incendii Aetnae anni 1669*, printed *Regio Jalis* in 1670, in 4^{to}, one of these copies to be presented to the body of the society, another to the president, and the rest to be distributed amongst the members of the same. Besides a copy of Signor REDI's answer to Monfr. CHARAS's book about the fear of the poison of vipers.

2. A Latin letter of Signor CASSINI to Mr. OLDENBURG, dated at Paris Aug. 20, 1671², accompanying his printed account of the spots lately seen in the sun, together with his observations on Saturn's rings: Which account and Signor BORELLI's book on the burning of mount Aetna were referred to the perusal of Dr. POPE and Mr. HOOKE to report to the society the contents of them.

3. Two Latin letters of Mr. HEVELIUS to Mr. OLDENBURG, one of 19 June, 1671³, about an occultation of Saturn by the moon; another of October 7, 1671⁴, containing several observations, as the late immersion of one of the Satellites of Jupiter into his shadow, the late eclipse of the moon, the late transit of Jupiter and the moon, and the present phasis of Saturn in regard of his rings; as also the re-appearance of the two new stars in the neck of the whale, and near the beak of the Swan.

These letters were referred to the professors of astronomy and geometry in Gresham-college to consider and make report of them to the society.

4. A Latin letter to Mr. OLDENBURG from Monfr. SLUSIUS, dated at Leige July 18, 1671⁵, N.S. containing his thoughts of the edition of Diophantus by Monfr. FERMAT printed at Thoulouse, in 1670, in fol. and divers other books lately published; as also concerning a sublimation of his of antimony *per se* into a true sublimate, and a remark on the German Spa waters, with an experiment about nitre.

6. A Latin letter from Dr. FOGELIUS of Hamburg to Mr. OLDENBURG, dated there 11 Aug. 1671⁶, containing CASSINI's ephemerides of the immersions of the *Stellæ Medicæ* into the shadow of Jupiter, and concerning Monfr. PICART's observations of the late spots in the Sun made by him at sea.

The observations on the Satellites of Jupiter were recommended to the professors of astronomy and geometry at Gresham-college.

¹ Letter-Book, vol. iv. p. 373.

² Ibid. p. 382.

³ Ibid. p. 326. It is printed in the *Philos. Transact.* vol. iv. n^o 78, p. 3027, for Decemb. 1671.

⁴ Ibid. vol. v. p. 3. An Extract of it is printed in the *Philos. Transact.* vol. vi. p. 3028.

⁵ Ibid. vol. iv. p. 342.

⁶ Ibid. p. 349.

7. A letter of Mr. WILLUGHBY to Mr. OLDENBURG, dated at Middleton 24 Aug. 1671*, containing some observations about that kind of wasps, called *vespe ichneumonæ*, especially their several ways of breeding, and among those, that of laying their eggs in the bodies of caterpillars, &c.

8. A letter of Mr. LISTER to Mr. OLDENBURG dated at York 25 Aug. 1671*, confirming his former observation about musk-scented insects, and adding some notes upon Dr. SWAMMERDAM's book on insects, and on Mr. STENO's *Prodromus* concerning petrified shells.

This letter gave occasion to some of the members to discourse on the subject of petrified shells, some applauding Mr. LISTER's notions of it; but Mr. HOOKE endeavouring to maintain his own opinion, that all those shells are the *exuvie* of animals.

Dr. CLARKE related, that in 1665, when the King was at Salisbury, Dr. HAUGHTON, a physician of that place, shewed his Majesty a stone of two and twenty pounds weight, which was found upon a castling, and taken together with it out of the uterus of a cow; and that the pieces of the stone being broken resembled cockle-shells, and had plainly the shape of them.

Sir ROBERT MORAY produced a certain substance delivered to him by Monfr. SCHROTER, seeming to be a new kind of metal, and said by him to be the remains of six ducats, and to weigh about eight or nine grains, the rest having been, by means of a menstruum not corrosive, volatilized and evaporated away. This remainder was malleable and endured the coppel, but was not dissolvable by aqua fortis or aqua regia, and was lighter than copper, having been by Mr. BOYLE weighed in water.

It was delivered to Mr. HOOKE, to recommend it to Mr. SLINGESBY and the officers of the mint, in order that they might try, whether they could any way destroy it; with a request, that they would impart to the society the result of their trials.

Dr. WALTER NEEDHAM read part of a letter to him from Mr. TEMPLER, dated Octob. 28, 1671, containing an observation on some livers of eels, first dried in an oven, then kept in a glazed earthen pot in a warm place, and found to have husks in the powder, to which they were reduced; which husks were thought to be the *exuvie* of some worm or maggot, when it turned to a fly.

Mr. OLDENBURG presented to the society in Dr. WALLIS's name the third part of his work *de mētē*, printed at Oxford in 1671, in 4^{to}.

* Letter-Book, vol. iv. p. 355. It is printed in the Philos. Transact. vol. vi. n^o 76, p. 2279, for October 1671. * Ibid. p. 358. It is printed in the Philos. Transact. vol. vi. n^o 76, p. 2281.

He presented likewise from Sir ROBERT SOUTHWELL, for the repository, a bag with a great number of marcasites or pyrites of a cubical figure; as also an odd bone with two ribs in it, both found in Ireland.

He presented also from Mr. HOBBS his *Respetum Geometricum*, printed at London in 1671, in 4^{to}, together with three printed papers of the same author, addressed by him to the Royal Society for their judgment thereon: Which pieces were referred to the consideration of the professors of astronomy and geometry in Gresham-college and Mr. COLLINS.

November 9. At a meeting of the COUNCIL were present

The President

The lord HOWARD of Norfolk
The lord bishop of SALISBURY
Sir PAUL NEILE
Sir JOHN BANKES

Dr. GODDARD
Mr. COLWALL
Dr. CROUNE
Mr. OLDENBURG.

The president, Sir ROBERT MORAY, Sir PAUL NEILE, Dr. GODDARD were appointed a committee for auditing the accounts of the treasurer.

N^o 77 of the *Philosophical Transactions* was licensed.

SPENCER HICKMAN was sworn as one of the printers of the Royal Society, after he had been constituted such by the president, according to the power granted him by the additional charter.

At a meeting of the SOCIETY on the same day,

Mr. HOOKE produced a watch, to shew a way of making a clock to go twice as long as before, only by the contrivance of a little piece of wire added to an ordinary clock.

The matter having been debated, Mr. HOOKE was desired to put it into effect; which he said he intended to do in a clock of his, that went eighteen months; which by this means would go three years with once winding up.

Mr. RAY's letter to Mr. OLDENBURG, dated at Middleton Sept. 12, 1671¹, was read, containing an account of the dissection of a porpoise; for which the writer being present received the thanks of the society.

There was also read a letter of Monsr. HUYGENS to Mr. OLDENBURG, dated at Paris November 7, 1671², giving an account of his late observations of Saturn; as also of his having recommended to an observer travelling to America a pen-

¹ Letter-Book, vol. iv. p. 366. It is printed in the *Philos. Transact.* vol. vi. n^o 76, p. 2274, for October 1671.

² Ibid. vol. v. p. 36. An Extract of it is printed in the *Philos. Transact.* n^o 78, p. 3026.

dulum watch of his, adjusted after a new manner, for observing the longitudes, and in his opinion so contrived, that it may better resist the agitation of the vessel than his former.

This letter was accompanied with a printed paper, containing a sequel of the observations of the Solar spots at their first appearance; as also some observations of the late and present phases of Saturn and his *ansule*.

A letter of Dr. FOGELIUS to Mr. OLDENBURG, dated at Hamburg 1 Novemb. 1671*, was read, treating of the observations of the Solar spots returned (after they had passed the Sun's hemisphere, that is hid from us) from August 26 to Sept. 5, O.S. inclusive; as also concerning some uncommon plants.

Monfr. SCHROTER presented the following paper concerning the manner of making at Nuremberg in Germany the foils, which goldsmiths use to put under precious stones.

" Concerning the preparing those foliers, it is to be observed, 1. How and out of what substance they are prepared. 2dly. How they are to be polished. 3dly. How they are to be coloured. 4thly. The furnace, wherein they are to be made.

" The first, viz. the substance, out of which they are made, is nothing else but copper, which either is beaten thin, or by a plate-mill is brought to that thinness.

" Concerning the second, viz. polishing; they make use of an half cylinder made of brals, upon which they lay those foliers, and polish them with blood-stone, wetting them during the polishing continually with pure v.

" Concerning the third, viz. the colour they do apply, I must first describe the furnace, which is necessary to that work. The same is made of clay, in a manner as a muff, having in the front a channel or pipe, being four square and four fingers broad, through which the fumes do pass, and behind it has a door to close it: then there must be made a large plate of iron, with a hole in the midst of it, having two feathers of steel, to keep the foliers close to it; as shall be said.

" They cut these laminated copper plates four square, as those foliers commonly appear, and lay as many as they please together, and with the said feathers hold them close to the hole, which is in the iron plate as above said.

" Now to speak of the colour itself, they first take good coals of a hard wood, and put them into the furnace, and being almost burnt, they shut the door, that

* Letter-Book, vol. v. p. 30. An Extract of 1678, p. 3033, for December 1671.

it is printed in the Philos. Transact. vol. vi. * Register-Book, vol. iv. p. 110, 111.

" is behind, and put before the hole of the pipe or channel above said the iron plate with the foliers affixed; so that the foliers come just before the said orifice or hole of the pipe; and thus one folier after another will by the smoke of the coals draw a colour, and become of a dull reddish colour. The first folier having thus contracted the said colour, they take it off, and the other will do the like, till all have done it. Then they lay the foliers again together, and fix them to the plate the second time as before, and apply them in the same manner to the orifice of the said prominent pipe. Now they make use of another iron plate to put it in the furnace, and being hot, they lay a piece of a tail of a ermelin on it, and the door behind being shut, the smoke of it will give them a rubine-colour, and the longer they are smoked, the finer will be the colour, but the smoke continuing longer, the said rubine-colour will change into an amethyst, and at last into the colour of a sapphire.

" It happens sometimes, that some of these foliers have not their just and fit colour, and for that cause are useless for this our purpose; and those they separate from the rest, and at last they do apply them with the rest to the orifice of the channel as above said; having first taken out of the furnace the iron-plate with the ermelin tails, and put other red coals (but very few) into the furnace: then the heat of the coals purgeth the foliers of the said dull colour: Then they observing, that the foliers incline to a blue colour, they judge them to be qualified for their purpose; for then they take one after another with that blueish colour off, and then jointly fix them again to the plate; put some more red coals into the furnace with an iron plate upon it, which being hot they draw a leaf of sage upon it, the smoke of which affords a green colour to the foliers, and one or two leaves of sage not colouring enough, they put more upon the hot plate, till the green colour is high enough: But above one leaf at once must not be drawn upon it; otherwise it will be spoiled.

" The foliers thus being prepared, they cut them four-square, that so that, which at the ends seems of no colour but dull, might be cut off."

It being moved, that it was now a reasonable time to make experiments of cold, and it being intimated by Mr. OLOENBURG, that Mr. BOYLE had examined a considerable one concerning the process of freezing, related in the Florentine book of experiments, Mr. BOYLE was desired to give an account of it to the society; which he said he would do at their next meeting by a paper, in which he had set down the particulars of his trials of this matter.

November 16. The five following members were nominated by the president, and chosen by ballot to be a committee for auditing the accounts of that year, viz. CHARLES HOWARD of Norfolk, Dr. WALTER NEEDHAM, Dr. POPE, Mr. CREED, and Mr. COLLINS; who agreed to meet for that purpose on the Thursday following at Arundel-House, some time before the public assembly of the society.

Dr. GREW was elected into the society.

Mr.

Mr. HOOKE promised a new way of dividing a small quadrant to make astronomical observations with, as distinctly as with far greater ones. This he said was demonstrative, and he promised to bring in such a one at the next meeting, together with the demonstration, to be registered.

There was read his account of the late solar eclipse of the moon 8 Sept. 1671; which was ordered to be registered*.

Mr. OLDENBURG read a Latin letter written to him out of Iceland by PAUL BIORNONIUS, minister of a church there, dated 13 July 1671[†], containing his answers to divers philosophical queries sent to him by Mr. OLDENBURG, dated 11 March 1671[‡].

It was ordered, that more queries be sent to the writer of this letter, especially such as relate to the tides, and the magnetical declinations and inclinations in that country, and in several places thereof; in respect of which letter Mr. HOOKE was desired to draw up some directions, and to cause a long magnetical needle to be made in order to be sent thither.

Mr. OLDENBURG produced a letter from Mr. LISTER, dated at York Nov. 11, 1671[§], accompanying a certain substance, called by him *Resina nigra*, being the juice of a plant coagulated, and serving, as he affirmed, for a fixt black, he having written with it as well as with good ink. Some of it was ordered to be delivered by Sir ROBERT MORAY to Prince RUPERT, and the rest by Mr. OLDENBURG to Mr. BOYLE, for trial; the success of which they were desired to communicate to the society.

Mr. OLDENBURG read likewise a letter from JOHN WERDEN, esq; the King's resident in Sweden, dated at Stockholm 24 June 1671^{||}, giving an account, that he had been informed by Dr. DURIER (or DU RIEDS) physician to the King of Sweden, that a more effectual remedy to prevent the hurtful effects of frost on human bodies than snow is (as the Doctor had tried upon himself and others) to mash and chew pease, and then cover over the frozen part, whether nose, cheeks, or ears. Mr. WERDEN observed likewise, that on the day before at three in the afternoon the spirit in his sealed weather-glass was up at $7\frac{1}{2}$ inches above $\ominus$, that is $12\frac{1}{2}$ inches higher than it was at the lowest in February preceding; which made him apter to believe what divers persons had assured him, that the heat at Stockholm, during the small time it lasts, is greater than in Spain.

Sir ROBERT MORAY produced for the repository a specimen of vitriol, which he said grew in some of the King's plantations in the Antilles.

* Register, vol. iv. p. 108. It is published in the *Philos. Transact.* vol. vi. n^o 77. p. 2296.

† Letter-Book, vol. iv. p. 374.

‡ Ibid. p. 239. It is published in English in

the *Philos. Transact.* vol. ix. n^o 111. p. 238, for Feb. 1674-5.

§ Ibid. vol. v. p. 42.

|| Ibid. vol. iv. p. 328.

It was moved, that trials might be made with it, to see, whether, when dissolved, it would crytallize just like common vitriol, or differently.

Sir ROBERT MORAY exhibited a certain plant, which was called by Mr. RAY *Lichen terrestris cinereus*, and said by Sir ROBERT to be very good to cure dogs bitten by mad dogs; the duke of YORK having caused it to be given to a whole kennel of dogs bitten by a mad one, which were all cured, except one of them, to whom none of it was given.

November 23. Mr. HOOKE produced an instrument contrived by himself to shew the point of the compass, in which a person travels. He was desired to bring in the description of it in writing; as also to endeavour to compound this with that instrument, which he had produced before, whereby the way of a traveller may be traced upon a piece of paper, that so by one and the same instrument a traveller may make the map of the country, through which he passes, and at the same time know, to what quarter of the world he goes.

He produced a specimen of his new quadrant, which being but of seventeen inches would perform the same as a quadrant of twenty four feet.

This quadrant was ordered to be fitted up in all its parts, that the use of it might the better appear.

A paper of Mr. BOYLE's was read, containing the phenomena of an experiment about freezing made by him upon the occasion of his having read and considered that experiment published among those of the Florentine academy *del Cimento*, wherein they say that they found a considerable intumescence or rising of the water, which immediately precedes the glaciation; which Mr. BOYLE could never satisfy himself in. His paper was ordered to be registered*, as follows:

" We took a bolt-glass bigger than two turkey-eggs, with a stem, which we
 " caused to be drawn out at a lamp, till it was as slender as a goose-quill or there-
 " abouts. This vessel was filled with water, till the liquor reached to a pretty height
 " in the slender part of the stem: then I put it into a mixture of beaten ice and
 " salt, in which mixture a cavity had been made before, to receive a good part of
 " it; but though, upon our putting the glass into this cavity, there would at the
 " top seem to be some little shrinking down of the water; yet that was very
 " small, and sometimes very scarcely, if at all discernible; nor did the water
 " afterwards appear to subside and exhibit the other phenomena of freezing water,
 " mentioned by the excellent Florentine virtuosi; only when the liquor began be-
 " low to be turned into ice, the quick ascent of it was manifest enough.

" Wherefore we afterwards caused the stem of a round bolt-head of clear glass,
 " whose globous part was about $3\frac{1}{2}$ inches in diameter (taken on the outside with
 " calliper compasses) we caused, I say, this stem to be drawn out at the flame of
 " a lamp, till it was at least as slender as a raven's quill, and the glass being filled

* Register, vol. iv. p. 112.

" with

“ with water to a competent hight, that the expansions and dilatations of it might
 “ be very manifest in so slender a pipe, we observed the ensuing phenomena :

“ First, as soon as the globous part of the glass came to be as it were immersed
 “ in the frigorific mixture, the water in the small stem instantly ascended, some-
 “ times the length of a barley-corn, and sometimes less and sometimes more.
 “ This ascension was so hastily made, that it often began and ceased almost in the
 “ same moment ; after which the water began (though more slowly) to subside
 “ again to its former station or thereabout, which with other circumstances made
 “ it very probable, that, as the Florentine virtuosi ingeniously labour to prove,
 “ this sudden change proceeded rather from the constriction of the glass itself
 “ upon the first contact of the frigorific mixture, than upon the sensible conden-
 “ sation of the water, which is not likely to be so suddenly effected.

“ Secondly, but whereas the newly named philosophers recite as a constant
 “ phenomenon, that after the first subsidence of the water, and a subsequent pause
 “ for a pretty while, the water will be considerably depressed once more before
 “ it begins to rise, we could very rarely indeed and scarce ever observe such a
 “ thing to happen, though I cannot suspect myself to have ever seen it for want
 “ of attention : for my expectation of such a subsidence of the water, and its not
 “ appearing to me the first and second time, invited me to repeat the experiment
 “ several times one after another, and to look very attentively upon the water,
 “ and the marks carefully stuck on the side of the glass to observe the motion of
 “ the liquor. And this seemed the rather strange to me, because I had often for-
 “ merly observed in trials purposely made on other occasions, that water in conven-
 “ nient glasses would suffer some degree of condensation by the action of a frigi-
 “ rific mixture before it would begin to discover any ice in it. But having re-
 “ iterated the experiment, till I, and those that assisted me, grew weary, I was fain
 “ to abandon it, leaving the prosecution of it to further trials ; for I dare not su-
 “ spect, that so many eminent virtuosi, as ennoble the Florentine academy, could
 “ mistake or would misrelate a matter of fact, not once but frequently and uni-
 “ formly taken notice of by them : and besides that (as I was saying) it is con-
 “ sonant to my own experiments on other occasions, in one of the glasses, where-
 “ in I tried this very experiment, I observed the second subsidence to be very con-
 “ siderable : so that I cannot but suspect, that the so differing events of their trials
 “ and mine, as to this phenomenon, may proceed either from some peculiarity in
 “ the water they employed, or in the qualities of the glass, which the vessels I used,
 “ were made of, or in the length or slenderness of the stem, considered together
 “ with the grossness of our English air in snowy weather ; the pressure of the air
 “ having elsewhere been shewn by me to have a great stroke in divers condensa-
 “ tions ascribed to cold : but whether to any of these things, or to any other,
 “ that which, we have related, is to be reduced, future trials must determine.

“ Thirdly, I observed for the most part, that after that subsidence, that almost
 “ immediately attends the first rising of the water, there would be for some time,
 “ more or less, a resting of the surface of the water in the same place, which
 “ continued till the upper part of the water began to ascend upon the beginning
 “ of

" of its glaciation of its lower parts; and the duration of this pause or rest of
 " the water I found to be very uncertain, being at some times at least twice or
 " thrice as long as at other times, according as the frigorific mixture did more
 " or less vigorously operate upon the neighbouring water.

" Fourthly, though if the experiment were tried in glasses, whose stems were of
 " an unusual bigness, the ascension of the water in the stem upon the glaciation of
 " it in the globous part was not so quick as to be very remarkable; yet, when the
 " stem was drawn out to such a slenderness as was before described, the water, after
 " having (as I lately noted) rested a while, would upon its beginning to freeze be-
 " neath, ascend so hastily in the stem, as appeared strange enough, especially at
 " the first sight: so that usually its progress upwards was very obvious, and some-
 " times made with such celerity, that in one minute of an hour or much less, it
 " would as it were shoot up several inches, and would have probably ascended
 " much higher within half a minute more, if the slender part of the stem had
 " been long enough to permit it.

" Fifthly, but whereas the Florentine academicians inform, that there is a conside-
 " rable intumescence or rising of the water, that does immediately precede the
 " glaciation, I never could satisfy myself, that I observed such a phenomenon:
 " but in spite of frequently repeated trials (both alone, and before others) and of
 " such a degree of attention, as perhaps is not often employed even in more nice
 " trials, it always appeared to me, that the ascension of the water was at least
 " accompanied, if not rather preceded, by the actual glaciation of some parts of
 " the water, that were most contiguous to the frigorific mixture, or exposed to
 " those portions of that mixture, which were the most operative. Nor did it seem
 " easy to me to assign any other, or, at least, better reason of the ascension of
 " the water in the slender stem, than the expansion, that is wont to accrue to water
 " upon its being actually turned to ice. It is true, that in slender stems the rising
 " of the water will be manifest upon the production of so thin and transparent films
 " of ice, at the bottom or some of the lateral parts of the globe the water is
 " contained in, that it has often deceived even attentive eyes, and would have
 " deceived me too, if the newly intimated conjecture at the reason of the intum-
 " escency of the water had not made me extraordinarily suspicious, and invited
 " me to look upon the glass taken out of the frigorific mixture (and then wiped
 " and held against the light) in so many differing postures, that though in some of
 " them I could not, yet in others I did discover thin portions of ice, which some-
 " times I could within a minute or less make visible to others, because this ice
 " upon thawing would not unfrequently emerge to the confines of the globe and
 " stem, and there become easily enough discernible to a heedful eye. And
 " though, when I guessed, that the water was upon the point of beginning to
 " freeze, I took it out of the frigorific mixture, to try, if it would afterwards
 " freeze or make the liquor in the slender pipe ascend; yet I never was so fortun-
 " ate to observe any ascension of the water in the stem, but when there was
 " actually some particles of ice in the ball, which though I newly took out of the
 " mixture, as soon as I could perceive the least beginning of rising in the slender
 " part of the stem; yet I regularly found more or less ice to have been already
 " actually

" actually produced at the bottom or sides of the globe. The ascension of
 " bubbles about the time of the water's congelation (especially if the glass were
 " stirred) I do not here solemnly take notice of, it being an usual concomitant of
 " the glaciation of water.

" Sixthly, it was remarkable and not unpleasant in one experiment, that not
 " only, if the glass were taken out of the mixture, very soon after the water be-
 " gan to ascend in the stem, the thaw, by reason of the extraordinary thinness of
 " the ice, would begin so quickly, that, within about half a minute or sometimes
 " much less, the liquor would begin to subside manifestly again; but when the
 " water was sufficiently disposed to congelation (which it usually was, if the
 " glass were put into the frigorific mixture soon enough after the total dissolution
 " of the little portions of ice newly mentioned,) it would upon the contact of the
 " frigorific mixture (though the globe were but half buried in it) begin to gla-
 " ciate in a trice; inasmuch that making observation by a minute watch, I have
 " had the water shoot up in the stem within half a minute so as to discover ice in
 " it, and within two minutes (from first to last) to exhibit ice in most parts of the
 " cavity of the globe."

Mr. RAY produced an extract of a letter written to him by Mr. FISHER out of
 Yorkshire, giving notice, that the said Mr. FISHER had newly found out a men-
 struum, that dissolved glass, and reduced it into a white calx; and that after the
 glass is well moistened with the menstruum, it may be shaved with a sharp knife
 almost like horn, though it be much more brittle than horn.

Mr. RAY was desired to inquire of Mr. FISHER, 1. Whether he was so much
 master of this experiment, as to make it when he pleased. 2. Whether the men-
 struum performed as well upon the best and finest, as the worst and coarsest glass.

Mr. OLDENBURG produced Mr. FLAMSTEAD's paper concerning his predictions
 and calculations of the stellar eclipses and transits, to happen in the year 1672:
 which paper was ordered to be immediately printed in the *Philosophical Transactions*
 * for better communication.

Sir SAMUEL TUKE produced a narrative written by Mr. FRANCIS FINCH, Nov.
 14, 1671, concerning a maggot, which by an extraordinary way of feeding was
 increased to the size of a man's thigh.

Mr. WILLUGHBY and Mr. RAY were desired to try this experiment at a favour-
 able season.

Sir ROBERT MORAY acquainted the society, that the lord WILLUGHBY had pre-
 sented them for their repository with several curiosities of Barbadoes and other
 American islands; which were ordered to be produced by Mr. HOOKE on the
 Thursday following the day of their anniversary election.

* It is printed vol. vi. n° 77. p. 2297. for Nov. 1671.

Nov. 30. At a meeting of the COUNCIL were present

Sir ROBERT MORAY Vice-president	
Sir PETER WYCHE	Mr. HENSHAW
Mr. DANIEL COLWALL	Mr. OLDENBURG.

The report of the committee for examining the treasurer's accounts was made and approved of, viz.

" At a committee of the council of the Royal Society for auditing the treasurer's accounts, Nov. 21, 1671,

" Upon the examination of Mr. DANIEL COLWALL's accounts we find him
" debtor

" To the arrears due to the said society for their quarterly }	<i>l.</i>	<i>s.</i>	<i>d.</i>
" payments, this 21st Nov. 1671. ———	1696	0	0

" To monies he hath received for admision ———	2	0	0
---	---	---	---

" To the balance of the last account ———	68	15	10
	<u>1766</u>	<u>15</u>	<u>10</u>

" He is creditor

" By monies he hath paid to the use of the society ———	202	1	4
--	-----	---	---

" By arrears yet unpaid by the fellows of the society —	1554	4	0
---	------	---	---

" By balance resting in cash in his hands ———	10	10	6
	<u>1766</u>	<u>15</u>	<u>10</u>

" Signed Brouncker, P.R.S.

" R. MORAY,

" J. GODDARD,

H. OLDENBURG, Secr."

At a meeting of the SOCIETY on the same day,

Sir JOHN WILLIAMS, Mr. REDDING, and Dr. GREW were admitted.

This being the society's anniversary election-day, the members present, to the number of forty-six, proceeded to the business of the day, after they had received the report of the committee for auditing the accounts, which was as follows :

" At a committee of the Royal Society for auditing the treasurer's accounts,
" Nov. 23, 1671,

1

" We

1671.]

ROYAL SOCIETY OF LONDON.

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" We certify, that it appears the treasurer hath received on	}	<i>l.</i>	<i>s.</i>	<i>d.</i>
" the quarterly payments of the society in all to the 21st		141	16	0
" Nov. 1671,				
" That he hath received for admision		2	0	0
" That he is debtor to his last account of the 10th of Nov.	}	68	15	10
" 1670,				
		212	11	10
" It also appeareth,				
" That he hath paid to the use of the Royal society, by bills	}	202	1	4
" and orders of the council				
" That he hath resting in cash now in his hand		10	10	6
		212	11	10

The eleven members following were continued of the council,

The lord viscount BOUNCKER	Sir ROBERT MORAY
The lord HENRY HOWARD	Sir PAUL NEILE
of Norfolk	Mr. HENSHAW
The lord bishop of SALISBURY	Mr. COLWALL
The lord bishop of CHESTER	Dr. GODDARD
Mr. AERSKINE	Mr. OLDENBURG.

The ten new ones elected were,

The earl of ANGLESEY	Sir JOHN FINCH
The lord viscount STAFFORD	Sir WILLIAM PETTY
The lord BERKLEY	Sir THEODORE DE VAUX
The lord BRERETON	Dr. WALTER NEEDHAM
Mr. BOYLE	Mr. CREED.

Of these ten were sworn,

The lord viscount STAFFORD	Sir WILLIAM PETTY
The lord BRERETON	Sir THEODORE DE VAUX
Sir JOHN FINCH	Dr. WALTER NEEDHAM.

The officers elected were,

The lord viscount BOUNCKER, president.

Mr. COLWALL, treasurer.

* In neither the Journal nor the original minutes of Mr. OLDENBURG is there any entry of the election of secretaries either at this or the preceding anniversary election. Mr. OLDENBURG and Mr. HENSHAW are mentioned p. 436, as rechosen secretaries, upon these grounds, that the former is known to have held that office till his death in 1677, and that the latter had been chosen to it

Nov. 30, 1669. But whether Mr. HENSHAW was continued in it at the election of Nov. 30, 1671, is doubtful, as I find in a list marked by Dr. PELL for that election Mr. EVELYN designed by him for secretary in conjunction with Mr. OLDENBURG; to which office Mr. EVELYN was undoubtedly chosen Nov. 30, 1672.

On this occasion Mr. HOSKYNs described the way of making blue Rarch; which description, at the desire of the society, he promised to give in writing.

Dr. WALTER NEEDHAM read part of a letter to himself from Mr. TEMPLER dated Dec. 3, 1671*, endeavouring to confirm what he formerly related about the breeding of insects in the livers of eels dried and closed up; and that by an experiment of insects bred in a beef's bladder, blown in July or August, and so closed, that no passage was left for any fly-blows.

Mr. RAY suggested, that flies might have blown on the outside of the bladder; and that those fly-blows might eat through the bladder.

He was desired to try this experiment in a season proper for it, by including such a bladder in a case, to defend it from fly-blows outwardly as well as inwardly.

Mr. OLDENBURG produced and read a letter of Signor MALPIGHI, dated at Bologna Nov. 1, 1671, N. S. accompanying a manuscript containing an abstract of his observations and considerations of the structure of plants, which, he said, he intended to enlarge and to illustrate with figures, if he should find, that the society approved of his attempt.

It was ordered, that he should be solemnly thanked in a letter to be written by the secretary for his singular regard to the society, and his great care of improving natural knowledge: as also, that it be signified to him, that Dr. GREW had made the like attempt in his *Anatomy of vegetables* lately published in English; and that the society would be very glad to see Signor MALPIGHI's labours on that subject brought to that perfection, which was intended by him.

Mr. OLDENBURG produced a present of curiosities sent by Mr. WINTHROP to the society from New-England, together with a letter from Mr. WAIT WINTHROP dated at Boston Oct. 17, 1671†. The particulars were

An Indian bow and quiver of a dog's skin with arrows differently headed; some with horse-foot tails, some with stones, others with deer-horns or sharks-teeth:

The sword of a fish:

A small fish with an horn on his back.

Dec. 14. Mr. HOOKE mentioned, that he had prepared an experiment, to shew what degree of force will make air and quicksilver pass through wood; but that something was broken in the carrying it, which obliged him to defer this experiment till the next meeting.

* Letter-Book, vol. v. p. 63.
entered in the Letter-Book, vol. v. p. 72.

† Mr. OLDENBURG's letter was dated Dec. 14, 1671, and
* *Ibid.* p. 24.

He produced three several new contrivances of cider-presses for both breaking and squeezing the apples and pears with ease and expedition. The one was with two pinions turning upon one another. The other he represented in a crooked line, having a kind of a mill-box and a roller at the bottom, and by its motion breaking, squeezing, and throwing out the fruit. The third was with four cylinders turning one another, the apples coming between on two sides, and going out on the two cross-sides. He was desired to bring in a description of these engines in writing, to be entered in the Register-Book.

Sir ROBERT MORAY produced a paper containing a relation made by his Royal Highness of some remarkable phenomena of the frost near Croydon, in which pebbles and other hard stones had no marks of ice upon them, yet the pieces of chalk-stone or marl were covered with ice on the upper side.

Some of the members conceived, that in the marley stones being porous there might be a kind of salt, coagulating the moisture, that was upon them.

Mr. OLDENBURG read two letters written to him, the one by father PARDIES, a jesuit, from Paris, and the other by Mr. THOMAS HILL from Lisbon. The former in French dated October 20, 1671^a, intimated, that as the writer had written a small discourse concerning motion, so he intended to prosecute that subject, and should find a great satisfaction in so doing, if he might know, that his design was approved by the Royal Society. Besides which, he desired to be informed of what experiments had been made by the philosophers of England about sound *in vacuo*, he finding, that the Florentine academy had upon some trials declared, that they had found strings and flutes to give the same sound *in vacuo* as in the open air: which seemed very remarkable to him, if there were no mistake in the matter of fact, &c.

The other letter in English, dated July 23, 1671^b, offered the society the service of a Dutch jesuit residing in Brasil at the Bahia, having lived there many years, and travelled through that country more than any man, and being willing to give satisfaction in such inquiries, as the society should recommend to him.

Mr. OLDENBURG was directed to return the society's thanks to father PARDIES, Mr. HILL, and the Dutch jesuit, and particularly to encourage the first to go on in his work upon motion^c; and to desire the last to communicate to the society his observations made in Brasil.

Father PARDIES's letter gave occasion to Mr. BOYLE to acquaint the society; that he had made some experiments of sound in his engine, one with a pocket-watch, of which, when the air was well exhausted, he could see the motion, but not hear any sound, as he could do upon the readmission of the air. Another was with two wire-strings, being unisons to one another, of which when he struck one,

^a Letter Book, vol. v. p. 24.

^b Ibid. vol. iv. p. 345.

^c Mr. OLDENBURG's letter to Father PARDIES

in French was dated 18 December, 1671, and entered in the Letter Book, vol. v. p. 74.

the

the other was moved. Which experiments, he said, deserved to be farther prosecuted, to find, how far the air is necessary to sounds; and whether indeed motion may be propagated where there is no air.

Sir ROBERT MORAY mentioned, that one of his Majesty's musicians had lighted upon a way of making two notes by tuning only one string, which was received as a very ingenious contrivance; and Sir ROBERT MORAY was desired to procure a description of it.

Mr. HOOKE discoursed of a way of making a very compendious tablature of music; which he was desired to give in writing.

It was ordered, that, besides the experiments abovementioned, Signor MALPIGHI's manuscript on the anatomy of plants should be read; and the president desired to be in the chair at four of the clock at the farthest.

Dec. 21. Mr. ISAAC NEWTON, professor of mathematics in the university of Cambridge, was proposed candidate by the lord bishop of SALISBURY.

Mr. HOOKE brought in a written account of what he had proposed at the last meeting about the facilitating of a musical tablature; which being read, he was desired to complete it, and to bring in an example both of the common and this new way of tablature at the next meeting.

There was read part of Signor MALPIGHI's manuscript dissertation on the anatomy of plants; and it was ordered, that the papers should be delivered first to Dr. GODDARD and then Mr. HOOKE for their perusal; the former of whom accordingly took them with him.

The experiment formerly produced by Mr. HOOKE, to shew, what force would make air and mercury pass through wood was called for, but not succeeding, was ordered to be repeated at the next meeting.

Mr. BOYLE mentioned, that he had made an experiment to shew, that air will pass where water will not; which he was desired to produce before the society.

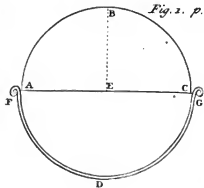
The society adjourned till the 11th of January following.

The End of the SECOND VOLUME.

ERRATUM.

Page 5, last line but one, after *described* add in his *Micrographia*.

Fig. 2. p. 155.



p. 158.
Fig. 2.

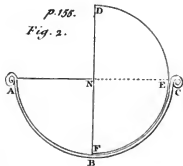
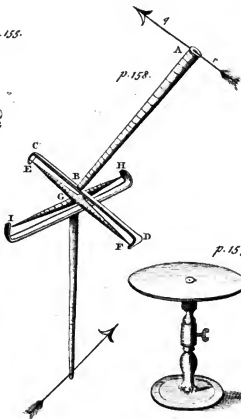
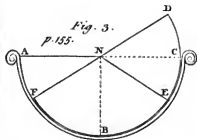


Fig. 3.
p. 155.



p. 157.



p. 157.



III. Vol II.

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